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**CIA HISTORICAL REVIEW PROGRAM  
RELEASE AS SANITIZED**

*Soviet Civil Defense*

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## PRINCIPAL FINDINGS

A review of the Soviet civil defense program leads us to conclude that:

- The program is more extensive and better developed than we had previously believed.
- The measures the Soviets are taking to protect their leadership, industry, and population could have a significant impact on both US and Soviet perceptions of the likely outcome of a nuclear exchange.<sup>1</sup>
- We cannot, at this time, make a confident estimate of the actual effectiveness of the Soviet program.

Thus, one of the most important findings of this study is that the civil defense problem demands priority attention by the Intelligence Community. Our current understanding of the Soviet program reflects a six-month survey of the available evidence, in the first detailed review of this subject since 1970. A more extensive and systematic collection and analysis effort will be required to resolve some of our uncertainties about the objectives and effectiveness of the Soviet civil defense effort.

Significant shifts in emphasis in the Soviet civil defense program occurred during the late 1960s and early 1970s. During that period the Soviets subordinated the entire civil defense program to military direction. They also increased their efforts to provide hardened command posts for the military and civilian leadership. At the same time, they modified to a degree their previous policy of mass evacuation of cities by placing somewhat greater emphasis on constructing hardened shelters within urban areas, a decision which they have attributed to concern that a nuclear attack could occur with little prior warning. Our study of Soviet civil defense has not revealed any major changes in the Soviet program since about 1971, nor does it suggest a crash program. Rather, the Soviets have been proceeding gradually but steadily to implement decisions evidently taken previously.<sup>2</sup>

<sup>1</sup> For the views of the Bureau of Intelligence and Research, Department of State, concerning the significance of Soviet civil defense measures, see the penultimate paragraph of the Summary and Conclusions.

<sup>2</sup> For the views of the Assistant Chief of Staff for Intelligence, Department of the Army, the Director of Naval Intelligence, Department of the Navy, and the Assistant Chief of Staff, Intelligence, Department of the Air Force, about the significance of the Soviet civil defense effort, see the final paragraph of the Summary and Conclusions.



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In reviewing what we know about the subject for purposes of this memorandum, we have acquired new appreciation of several aspects of Soviet civil defense:

- The subordination of the entire civil defense structure to military direction has resulted in a more effective organization for carrying out civil defense plans and operations. Civil defense training efforts concentrate on the personnel responsible for carrying out civil defense operations, rather than on extensive training of the general population.
- We have reconfirmed our previous judgment that hardened shelters and command posts are available for the top political and military leadership, and for military and civilian leaders at a number of capitals and military headquarters below the national level.
- Thus far, the hardened shelter program for urban areas is primarily for the protection of personnel judged by the Soviets as essential, rather than for protection of the general population.
- The expansion of industries during the past 15 years into areas distant from previously existing urban centers has not significantly reduced the vulnerability of Soviet industry to nuclear attack. Although light industries are somewhat less concentrated, Soviet heavy industries remain for the most part in large urban areas. The vulnerability of some industry has been reduced somewhat as a result of expansion of some industries into suburbs or "satellite towns."
- The numbers of underground structures discovered in a partial survey of industrial facilities, and the wide range of locations and industries at which such structures have been found, indicate that preparations for industrial protection are more extensive than we had previously realized.
- We have determined that the Soviets have reserves of food supplies and fuel located outside urban areas which could be used to support the urban population following a nuclear attack on cities, provided it could be distributed effectively. We do not know the actual size of these reserves or how long the available supplies would last. The most difficult problem for the Soviets would probably be to assure the survival of supply personnel, equipment, and communications, and to manage the complex distribution of supplies under chaotic conditions.

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Despite our extensive review, major gaps remain in our knowledge of Soviet civil defense. From unclassified materials and intelligence sources, we know that the Soviets have an ambitious program and we have a good understanding of their overall civil defense planning and organization. But we lack important details about specific classified plans. While we know that the Soviets are taking some actions with respect to all aspects of civil defense, we lack evidence on the progress they are making in many of their preparations.

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## SUMMARY AND CONCLUSIONS

### Organization

Beginning in 1971, military and civilian elements responsible for civil defense were integrated into a single nationwide organization, headed by a Deputy Minister of Defense at the national level and by commanders of military districts in the field. The leadership consists of at least 60 general officers, some of them at civil defense staffs as low as city level. The organization comprises at least 50,000 full-time personnel organized into staffs, civil defense troop units, civilian services, cadres, formations, and teams.<sup>3</sup> They operate at various levels extending from the Ministry of Defense through military districts, republic capitals, oblasts, and cities down to small districts (rayons) and economic installations. This organizational structure is supported by dedicated nationwide communications systems. The number of part-time participants in the civil defense organization is probably in the tens of millions.

### Mission and Objectives

Civil defense is an integral part of Soviet military planning for nuclear war. In Soviet military doctrine, it is one aspect of that part of military science concerned with "protection of the rear," which in nuclear war the Soviets consider to be the entire nation. They regard civil defense as a task vital to successful operations of the armed forces. It is part of a broader Soviet concept which we have characterized as "war survival," encompassing all the military and nonmilitary measures by which the Soviets seek to ensure the survival of Soviet society and the continuity of the Soviet state.

The mission of the Soviet civil defense organization is to carry out three basic objectives through peacetime preparation and wartime action. Soviet writings are not clear about the relative priorities of these objectives, but our evidence on actual preparations suggests that they fall in the following order:

- to assure the continuity of government and control by protecting the leadership through hardened urban shelters and relocation sites with supporting communications facilities;
- to provide continuity of operations of important economic facilities<sup>4</sup> by hardening and relocating these facilities, maintaining reserves of supplies and

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<sup>3</sup> *The Assistant Chief of Staff, Intelligence, Department of the Air Force, believes that the estimated minimum of 50,000 full-time civil defense personnel is too low and should include an additional 15,000 for manning civil defense communications systems at all levels.*

<sup>4</sup> Important economic facilities include industries, public utilities, transportation, and other facilities important to the war effort and postwar reconstruction. Essential personnel are those individuals who will be assigned under mobilization and civil defense planning to such facilities or services or will participate in emergency repair and restoration operations. Dispersal sites are predesignated locations outside urban areas which are close enough to the city to permit personnel of key economic facilities to commute daily to their place of work.

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materials, and protecting essential personnel through sheltering in urban areas and at dispersal sites; and

- to protect the nonessential part of the population through sheltering in urban and rural areas, evacuation of urban residents beyond the area of initial casualty-producing effects of nuclear strikes on cities, and at least minimal training and indoctrination in civil defense.

#### Protection of the Leadership

We have identified hardened urban shelters, alternate command posts, and supporting communications for protection of the military and civilian leadership in and near Moscow and at some capitals and military headquarters below the national level. The program to build such shelters is far from complete, but it appears intended eventually to provide hardened shelters and communications for Soviet military and civilian leaders at all levels.

- We have confirmed [ ] bunkered command posts in the USSR, not counting [ ] control centers of the Strategic Rocket Forces and numerous smaller bunkers for communications facilities [ ]

- [ ]  
— The characteristic pattern of such facilities includes hardened bunkers adjacent to military and civilian headquarters within urban areas and hardened relocation sites in suburban or rural areas, together with supporting communications systems, some with hardened antennas.
- While bunkers which have been identified for the leadership vary somewhat in design and structure, they appear in general to be hard enough to afford a good chance of surviving a nuclear attack unless targeted with accurate high-yield weapons.

#### Protection of Economic Facilities

The extent of Soviet preparations for the protection of economic facilities from the effects of a nuclear attack is greater than we previously realized. We have not yet been able to assess the effects of these measures on the vulnerability of important economic facilities to nuclear attack.

*Dispersal.* Soviet civil defense planning calls for redistributing industries outside urban areas, taking advantage of industrial dispersal brought about by economic requirements. The Soviets have created new towns near sources of raw materials and have established industries in many smaller cities in the course of their industrial expansion. We have determined, however, that the expansion of industries during the past 15 years into areas distant from previously existing urban centers has not significantly reduced the vulnerability of Soviet industry to nuclear attack. Despite their growth, Soviet heavy industries remain concentrated in large urban areas, although light industries are somewhat less concentrated.

The vulnerability of industry has been reduced somewhat by resiting facilities within large urban centers and by the expansion of some industries into suburbs or

"satellite towns." Also, some reduction in vulnerability has resulted from producing certain items of military equipment at more than one facility.

*Hardening.* Soviet planning also calls for hardening measures to reduce the vulnerability of economic facilities and equipment to nuclear attack. These range from underground facilities and protective engineering techniques to expedient measures for the protection of equipment. We have information on several hundred underground structures at a wide range of industrial facilities in various geographic areas. From the sample we have surveyed, first priority appears to be on defense industries, but performance in the defense industries is uneven. Some underground structures were evident at other industries as well. We have very little information on the extent to which other hardening techniques are being applied. Some defense industries are required to have plans for relocation just prior to a nuclear attack, but we do not know the number or type of plants involved in such planning.

*Protection of Essential Personnel.* It is clear that the emphasis in the Soviet urban shelter program since the late 1960s has been to protect essential personnel. We believe there are large numbers of hardened shelters available for this purpose but we have no estimate of the total or what percentage of the essential personnel could be accommodated. Workers would also be protected by movement to dispersal sites at predesignated locations outside urban areas which are close enough to the city to permit personnel to commute daily to their place of work. Emigrés have reported that advance preparations—prestocked supplies, shelters, and other facilities—to receive essential personnel have been made at some dispersal sites outside urban areas.

*Civil Defense Units.* Civil defense services and formations have been established at economic facilities to repair damage and restore operations. These units practice frequently and appear to be well trained.

*Reserves.* The Soviets maintain state reserves of critical supplies of industrial materials, equipment, fuel and food supplies, which have been reported as "large" by emigré sources. We have not determined, however, the location and size of the state reserves. If the normal flow of supplies to industries were halted, we believe they could continue production for only a few weeks without drawing on reserves. There are also reports of "strategic reserves" of supplies—presumably a level below which state reserves would not be drawn down during peacetime. Thus far we have identified 36 bunkered grain storage sites, confirming other indications that the Soviets have dispersed and protected some such strategic reserves. The capacity of the identified bunkers, however, represents only a small percentage of the capacity of the aboveground grain storage facilities located outside urban areas.

### Protection of the Nonessential Population

Since the late 1960s, the Soviets have given more emphasis in their policy statements and in their construction programs to shelters in cities. They attribute this shift in emphasis to a concern that a nuclear exchange could occur with little prior warning. In their shelter construction program first priority appears to be on hardened shelters for essential personnel. In most cities hardened shelters could accommodate only a small percentage of the nonessential population. Fallout shelters in cities could probably provide some protection from radiation. However, within cities the primary casualty-producing effects of nuclear detonations would probably be blast and fire, rather than radiation from fallout.

Therefore, the Soviets still rely heavily on evacuation to protect the nonessential urban population. Given a period of warning prior to a nuclear attack, Soviet

planning calls for movement of the nonessential urban population to evacuation sites up to 300 kilometers (186 miles) from likely urban target areas (farther from the urban center than the dispersal sites from which essential personnel would commute to the city). On the basis of our study of 12 representative Soviet cities, we conclude that, under most favorable conditions, movement of the nonessential population to evacuation sites and the improvisation of shelters for them could probably be completed within less than a week from a decision to evacuate. In this case, as the Soviets claim, evacuation of cities could reduce prompt casualties to a few percent of the urban population. We are not sure about longer-term protection—that is, the degree of protection from radioactive fallout that would be attained for large numbers of people at evacuation sites.

Although we are aware that large stocks of essential supplies—food, water, fuel, and medicine—are located outside urban target areas, we are unable to estimate with confidence how long such stocks would satisfy the needs of the population or how soon after the attack supplies could start to move from producers. There is no evidence that evacuation areas are being prestocked with essential supplies.

We have, however, a general appreciation of total supplies likely to be available (based on such things as overall geographic distribution of industry, population, and normal distributive storage), and we have made rough calculations of normal consumption rates of some categories of supplies. Such evidence as we have suggests that following a nuclear attack on cities which was preceded by a period of warning to make final preparations, supply levels would be sufficient to satisfy the minimum subsistence needs of the population for weeks and perhaps months. Distribution of supplies to the relocated urban population would probably be a more serious problem than stock levels.

Major portions of the Soviets' transportation equipment are normally located outside cities, and would probably not be destroyed by an attack on urban areas. If an attack were preceded by a period of warning, Soviet planning calls for the dispersal of transportation equipment from urban areas to predesignated sites outside cities. Nevertheless, important fixed transportation facilities and equipment in cities, including control centers, would be damaged and power for some segments of the electrified railroads would be disrupted. The most difficult problem for the Soviets would probably be to assure the survival of supply personnel, equipment, and communications, and to manage the complex distribution of supplies under chaotic conditions.

In the past several years, the emphasis in Soviet civil defense training, practices, and exercises has been on full-time and part-time personnel in civil defense staffs and organizations. The Soviets are relying primarily on programs at educational institutions and other organizations to indoctrinate the general population. This is a realistic approach to developing an effective civil defense capability, according to the findings of US civil defense experts.

#### Effectiveness of Soviet Civil Defenses

While it seems clear that civil defense preparations in the USSR are more extensive than we have been able to confirm, the status of preparations implied by our evidence is consistent with the Soviets' own acknowledgement that the objectives of their civil defense programs have not been fully achieved. They are concentrating, however, on those preparations which we believe are most valuable for recovery operations: an extensive well-defined organization at all levels of government; a

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training program focused on the primary implementing organizations; detailed planning to mobilize and control military and civilian resources; measures to reduce damage to economic facilities; and a leadership familiar with civil defense plans and having available to it both protection and facilities to control operations.

The effectiveness of Soviet civil defenses, including evacuation and recovery, in the event of an unrestrained US nuclear attack on urban areas would vary widely, depending on such circumstances as the size of the attack, weather, time of day, and season of year, but the period of warning prior to the attack would be a critical factor. Thus an evaluation of Soviet civil defense effectiveness must take into account the following circumstances:

- The most severe test for Soviet civil defenses would be a situation in which the first warning of a nuclear exchange would come after strategic nuclear attacks were in progress, regardless of which side initiated the conflict.
- The more likely situation would be one in which a nuclear exchange followed a period of tension in which both sides were aware of a heightened risk of nuclear war, providing time for at least some final civil defense preparations.
- Regardless of how the nuclear exchange eventuated, the US could launch an unrestrained nuclear attack designed to prevent the early reconstitution of the Soviet Union as a major power [ ]

We can draw only tentative conclusions about the effectiveness of Soviet civil defenses because of the large gaps in our knowledge of the program and the unknowables about its operation under stress. It is our tentative conclusion that, under optimum conditions, which included a period of warning prior to an unrestrained US attack during which evacuation and other prescribed preparations were implemented, Soviet civil defenses would: (1) assure survival of a large percentage of the leadership necessary to maintain control, (2) reduce prompt casualties among the urban population to a small percentage, and (3) give the Soviets a good chance of being able to distribute at least a subsistence level of supplies to the surviving population.

With minimal warning, some key leaders would probably survive, but the urban population would suffer very high casualties and the chances would be poor that the Soviets could distribute supplies effectively to the surviving population.

Our conclusions about the effectiveness of measures to protect economic facilities must be even more tentative. Our impression is that the protective measures we know about would be effective in reducing collateral damage to economic facilities which were not the primary targets of attack. We believe that, without warning of an attack, casualties among essential personnel would be very high. Warning may be less critical to the survival of economic facilities and equipment.

In spite of the potential contribution of Soviet civil defenses to survival of the leadership and to reducing casualties and damage to economic facilities, Soviet planners too would have major uncertainties in predicting the effectiveness of their civil defenses. Among the most important would be uncertainties about:

- the time available for implementing prescribed preparations prior to the nuclear strikes;
- the timing and size of initial and subsequent nuclear strikes and the extent to which urban areas would be targeted;

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- the aggregate effects, both prompt and longer term, of an attack involving several thousand nuclear weapons; and
- the magnitude of human and material casualties and the effect of their occurrence in a short period.

The Soviets' overall assessment of their present civil defenses against an unrestrained US nuclear attack probably is not a highly optimistic one. Indeed, the usually conservative Soviet planners may attribute lower capabilities to their civil defenses than we do, given the magnitude of the problems they face and the large uncertainties about the circumstances, scale, and effects of the nuclear attacks they would have to cope with. Even under the most favorable circumstances, they probably would have to expect a breakdown of the economy, and under the worst conditions they would have to anticipate catastrophic human casualties as well.

Despite all the problems and uncertainties, however, the Soviets probably believe that civil defense measures contribute to giving the USSR a chance to survive as a national entity and to be in a better position than the US following a nuclear exchange. They probably would expect their present civil defenses to be able to protect some key civilian and military leaders and political and economic cadres, to reduce damage to economic facilities, to reduce casualties among the population, and to support the conduct of military operations.

More threatening interpretations of the Soviets' motives and expectations for their civil defense programs are possible, but the evidence available to us does not suggest that Soviet civil defense preparations are being carried out on any crash basis or that they are peaking toward any particular target date. In any event, we have no doubt that the Soviets will continue their efforts to improve their civil defenses. They have long emphasized defense of the homeland in their military policy and believe that civil defense is a significant factor in the military balance. They are convinced that "protection of the rear" is vital to deterrence, to military success in war, and to national survival in the event of nuclear war. Whatever the nature of their specific current motivations, the Soviets would expect their civil defense efforts to contribute to their overall strategic posture and to enhance their prospects in nuclear war.

*The Bureau of Intelligence and Research, Department of State, believes that the Soviet civil defense program is seen by the Soviet leadership primarily as a prudent hedge against the possibility of attack by a nuclear-armed adversary. Moreover, INR believes that these Soviet civil defense efforts will not materially increase Soviet willingness to risk a nuclear exchange and will not undermine the deterrent value of US strategic attack forces. While fully agreeing that this is an important area of activity which deserves closer attention by the US Intelligence Community, INR believes that at the present time the scope of the civil defense program does not indicate Soviet strategic objectives beyond maintenance of rough strategic equivalence with the US.*

*The Assistant Chief of Staff for Intelligence, Department of the Army, the Director of Naval Intelligence, Department of the Navy, and the Assistant Chief of Staff, Intelligence, Department of the Air Force, consider that this memorandum accurately summarizes our present information on Soviet efforts to improve the war survival potential inherent in the Soviet civil defense effort. However, they judge the impact of this war survival effort upon the US-USSR strategic balance to be greater than that implied by these Principal Findings and Conclusions. They believe that the Soviet civil defense effort will have a definite and increasing impact on the US-USSR strategic balance. Moreover, they stress their belief that the Soviets are engaged in an*



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*effort to achieve a war-fighting and war-survival capability and that the civil defense program is an essential element in this effort. They are convinced that Soviet civil defense efforts are intended to contribute to the USSR's strategic posture by eroding US SIOP capabilities. Finally, they believe that the Soviets will increasingly strive to enhance their international position by capitalizing on their war-survival capabilities in order to manipulate policy decisions in the Third World and NATO.*

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## DISCUSSION

### I. INTRODUCTION

#### A. Purpose and Scope

1. This memorandum describes Soviet civil defense objectives and plans as we understand them, and assesses the progress the Soviets are making in carrying out civil defense preparations called for by their planning. As used in this memorandum, the term "civil defense" is intended to include all passive defense measures and military and civilian organizations and equipment which contribute to preserving the Soviet Union and its society.

2. The possibility of nuclear war has not been ruled out by Soviet officials, who assert that preparations to fight and win such a war require measures to minimize losses to government and political cadres, the essential labor force, industrial and agricultural productivity, and the population base for postwar recovery. Undertaking these measures is the responsibility of a nationwide civil defense organization directed by the military.

3. [

] The effectiveness of Soviet measures for protection of leadership, industry, and population could have an impact on US and Soviet expectations about the likely outcome of a US nuclear attack

[ ]  
4. The intent of this memorandum is to summarize what we know and do not know about Soviet civil defense programs from all sources of intelligence, and to assess the scope, pace, and progress of the preparations called for in Soviet civil defense manuals, handbooks, and other publications. The memorandum is more an exposition than a detailed analysis,

more a status report than a comprehensive estimate; it lays the foundation for collection activity and further intelligence investigation and production on the various facets of Soviet civil defense.

5. There has been no shortage over the years of Soviet pronouncements and publications about civil defense programs and activities; our problem is verifying and quantifying the progress of these programs and finding ways to assess their effectiveness. Beyond these difficulties there are major uncertainties about the short-, intermediate-, and long-term nuclear effects of a several-thousand-megaton attack and their implications for societal survival. Judgments among US experts differ both on nuclear effects and the degree of protection a civil defense program can provide. The Soviets also are under the weight of these uncertainties in determining the likely effectiveness of their civil defense preparations.

6. The scope of this memorandum encompasses three aspects of Soviet civil defense: the origin and role of civil defense in Soviet military strategy; objectives, priorities, and planning for civil defense; and Soviet progress in civil defense preparations and their effectiveness. The analysis of information and the presentation in this memorandum are organized as follows:

- organization and function,
- protection of the leadership,
- protection of essential personnel and the general population,
- protection of industry,
- training and exercises, and
- expenditures.

#### B. Analytical Approach

7. The order of presentation of material in the present memorandum corresponds to our analytical

approach, examining first Soviet civil defense strategy, objectives, and plans. These findings are the basis for measuring the progress the Soviets are making in carrying out their plans and, finally, where sufficient evidence is available, the effectiveness of their civil defense preparations is assessed.

### C. Attribution

8. This memorandum was requested by the National Intelligence Officer for Strategic Programs. Its preparation was a joint undertaking of the Central Intelligence Agency; the Defense Intelligence Agency; the National Security Agency; the Bureau of Intelligence and Research, Department of State; and the offices of the Assistant Chief of Staff for Intelligence, Department of the Army, of the Director of Naval Intelligence, Department of the Navy, and of the Assistant Chief of Staff, Intelligence, Department of the Air Force. Material in the memorandum is based on research papers prepared by the participating intelligence agencies. The working group was assisted by representatives of the US Defense Civil Preparedness Agency.

Chairman of the working group which prepared the memorandum.

## II. CIVIL DEFENSE IN SOVIET MILITARY STRATEGY

9. The Soviets regard civil defense as that part of military science concerned with protecting the population and leadership and continuing national productivity during war. It is part of a broader Soviet concept which we have characterized as "war survival," encompassing all the military and nonmilitary measures by which the Soviets seek to ensure the survival of Soviet society and the continuity of the Soviet state. The role of civil defense as an integral part of military strategy and planning in nuclear war was described in 1974 by Colonel General Altunin, Chief of Civil Defense of the USSR and Deputy Minister of Defense, as follows:

Civil defense in the last analysis is focused on ensuring successful operations by the armed forces, for the course and outcome of armed combat will in large measure depend on the protection of the civilian population and securing the survival of the economy.

Passive Soviet civil defense measures for nuclear war<sup>5</sup> are therefore inseparably linked to Soviet nuclear weapons employment doctrine, to active air and missile defense, and to those offensive forces employed to limit damage to the USSR. Therefore, the full impact of the civil defense measures described in this memorandum can be appreciated only in the context of overall Soviet strategy and strategic posture.

10. Today's civil defense efforts are part of the Soviets' response to the "revolution in military affairs," a phrase used by Soviet military strategists since the mid-1950s to describe the development of nuclear weapons and intercontinental missiles. The present Soviet civil defense program was shaped by Soviet strategy for nuclear war which emerged in the early 1960s, but its antecedents date from the first years of the Soviet state.

### A. Local Air Defense—the MPVO

11. The first Soviet civil defense effort began in the 1920s with the formation of a "voluntary" organization combining the functions of air and chemical defense, paramilitary training, and construction work in the civilian economy. In 1932, the Soviets established the first "official" agency having civil defense as its primary mission. It was an entirely civilian organization called the Local Air Defense (MPVO), and was subordinated to the Ministry of the Interior. Its establishment probably reflected concern about development of long-range aircraft and about foreign concepts of strategic bombing. The MPVO had a national staff and local units in cities and factories throughout the USSR. In the mid-1930s, as the danger of war with Germany grew, the MPVO instituted civil defense training nationwide. Despite these measures, on the eve of World War II Soviet leaders rated the civil defense program as poor and urged greater efforts. As a result, MPVO organizations multiplied, civil defense training was expanded, and an intensive program of industrial dispersal was undertaken.

12. During the war, the Soviets evacuated the population and industry of entire cities. Civil defense units erected defensive works, cleared obstructions, disarmed bombs and mines, and reconstructed indus-

<sup>5</sup> In addition to civil defense measures, the Soviets have been engaged since 1960 in an extensive hardening program for military facilities, involving missile silos, nuclear weapons bunkers, underground command and control facilities, aircraft hangarages, buried communications antennas, surface-to-air missile sites, and other installations.

trial and other structures. These actions facilitated military operations and contributed to expanding war production. Following the war until the mid-1950s the emphasis on civil defense declined, civil defense organizations were reduced, extensive civil defense training was abandoned, and regulations went unenforced.

13. The concept of localized air defense was altered in the late 1950s when the development of nuclear weapons and delivery systems exposed the entire country to nuclear attack. In the Soviet debate about nuclear strategy during this same period, most military leaders maintained that nuclear weapons would be decisive in future war and called for defensive measures against them. While the debate continued into the early 1960s, the changing Soviet views about nuclear weapons revived the lagging civil defense program.<sup>6</sup> Shelter construction in urban areas was renewed in 1954, extensive public civil defense training began in 1955, and evacuation procedures were instituted in 1958. During the late 1950s, shelters were constructed for senior party, state, and military leaders. All these programs were aimed at "the preparation of the population to protect itself from weapons of mass destruction and to deal with the aftermath of such an attack." Civil defense remained a civilian effort under the MPVO.

## B. Civil Defense and the Military

14. The civil defense concept developed in the early 1960s was the basis of the Soviets' present programs. Based on the proposition that "lines between the front and rear disappear in military operations involving the employment of modern weapons," a more comprehensive civil defense effort came to be viewed by some military officers as an integral part of strategic defenses. As a result, the Soviets placed increasing emphasis on the military importance of civil defense and on the responsibilities of regular military forces for civil defense tasks.

15. Soviet views about the proper relationship of civil defense to the defense of the country were reflected in the July 1961 decree of the Central

<sup>6</sup> In 1961, Defense Minister Malinovskiy resolved the controversy by decreeing that Soviet doctrine would plan primarily for a brief conflict with massive use of nuclear weapons, but also must be prepared to conduct a protracted campaign based primarily on nonnuclear forces mobilized during the war and supplied through wartime production. A major civil defense aim was to assist this mobilization and to smooth the transition to a war economy.

Committee of the Communist Party and the Council of Ministers of the USSR. This decree established a national civil defense organization to be called Civil Defense of the USSR rather than Local Air Defense. Responsibility for this effort rested with the Council of Ministers, which created the post of Chief of Civil Defense of the USSR. As a further sign of the importance of civil defense, the Council of Ministers named Marshal V. I. Chuykov, then Deputy Minister of Defense and Chief of Ground Forces, to fill this post. The activities of the Chief of Civil Defense and the staffs of civil defense under him were to be coordinated with the Ministry of Defense and with other ministries and state committees. The organization, staffing, and equipping of civil defense elements were to be supported by the budget of the Ministry of Defense but within the limits determined by the Chief of Civil Defense under the Council of Ministers. While the new decree represented a step forward in the development of a centralized system, this arrangement fell short of full military control over civil defense, even at the national level.

16. As inventories of strategic missiles increased in the 1960s, Soviet leaders showed greater concern about the destructive potential of a nuclear exchange and the prospects that a nuclear attack might occur with little warning. Soviet military writers, discussing nuclear strategy, civil defense concepts, and continued their repeated calls for closer cooperation between civil defense elements and units of the armed forces. In 1971, Civil Defense of the USSR became fully integrated with the Ministry of Defense. In mid-1972, Colonel General Altunin was designated a Deputy Minister of Defense and Chief of Civil Defense.

## C. Protecting the Population—Urban Shelters vs Evacuation

17. As late as 1968, Colonel General Beliaevskiy, Chief of Staff of Civil Defense, declared:

At present the most reliable protection for persons against all these weapons [of mass destruction] is evacuation from large cities and industrial areas.

Soviet writers indicated that civil defense leaders had made plans for large-scale movement of urban populations and workers to shelters in rural areas during the "special period" (period of warning preceding nuclear attack). These writers claimed that, without such measures, casualties could be 35 to 40 times as great.

18. At the same time, military and civil defense spokesmen appeared to differ over the role and importance of Soviet civil defense. Military leaders identified civil defense primarily with military propaganda. At the 23rd Party Congress in 1966, Minister of Defense Malinovskiy tied civil defense to "the military-patriotic education of the Soviet people," a theme repeated in the resolutions of the Congress. He also claimed that the Soviet Air Defense Forces (PVO) could "reliably destroy any aircraft and many enemy missiles," thus minimizing the protective mission of civil defense. Civil defense spokesmen took a different line. They asserted, as in Chuykov's words in 1969, that there could be "no complete guarantee that, in the event of war, our cities and important industrial centers will not suffer strikes with weapons of mass destruction." Although Chuykov acknowledged that civil defense "alone is not capable of solving all tasks of defending the population and national economy," he asserted that it formed an inseparable part of Soviet defensive efforts.

19. The stress on evacuation of cities during the 1960s appeared to be associated with military skepticism about the nature of civil defense in nuclear war. Many Soviet spokesmen envisioned nuclear war as involving a short, large-scale nuclear exchange, with Soviet cities primary targets. This may account for Soviet stress on evacuation as the only feasible means to protect the population. During the late 1960s, however, civil defense was undergoing a subtle shift of direction. Evacuation remained the principal focus, but Soviet writers increasingly concentrated on shelters in urban areas<sup>7</sup> as a secondary but important means of protection. For example, Chuykov, writing in 1968, described sheltering of people as one of the "more effective" civil defense methods. Subsequently, shelters have received increasing attention. In this program, highest priority was assigned to protecting military and civilian leaders, their supporting communications systems, and workers at key industrial facilities. At the same time, civil defense spokesmen continued to call for evacuation of the general population, claiming that a nationwide urban shelter program was a "very difficult task."

20. Recent statements about civil defense have placed more emphasis on shelters for the entire population. In his 1974 article "On the Theory of Civil Defense," Civil Defense Chief Altunin stressed that shelters constituted the "principal means of

<sup>7</sup> See footnote 26, Chapter VI, for a discussion of the Soviet definition of "urban areas."

protection," particularly under conditions of threat of sneak attack, and called for studies aimed at "seeking more effective ways to provide the entire civilian population with shelter facilities which fully meet the requirements for protection."<sup>8</sup> While General Altunin also called for improved evacuation procedures, particularly for reducing evacuation time, the shift to more stress on shelters was clear. This emphasis in the civil defense program is consistent with current Soviet concepts for survival in nuclear war.

#### D. Civil Defense in Current Soviet Military Strategy

21. Soviet military and governmental leaders continue to regard nuclear war as possible, although they refuse to assign a specific degree of probability to it. Soviet theorists contend that nuclear war would begin with the massed use of nuclear forces by both sides against each other's strategic and theater forces, command and communication facilities, war-related industry ("military-economic centers"), and centers of government. Each side would aim not only to reduce the opposing country's second-strike capability as much as possible, but also to disrupt national mobilization of its civilian population and economy, and then to weaken its ability to conduct subsequent operations. Soviet writers regard the first large-scale nuclear strikes as likely to determine the later course and outcome of the war.

22. Soviet concepts about nuclear war have changed somewhat from those of the 1960s. At that time, most Soviet theorists maintained that the West probably would undertake a variety of prewar actions to assemble maximal nuclear strike forces, mobilize theater forces to exploit the result of the strikes, and safeguard their own forces and population from retaliation. Because these preparations could be detected, many Soviet writers contended that the "period of direct threat" or "special period" which would precede a nuclear conflict would be sufficient both to launch a preemptive attack and to evacuate major cities and industries. Increased technical reconnaissance capabilities strengthened this view. Many Soviet military officers were concerned, however, that evacuation would give warning to the enemy and thus

<sup>8</sup> According to Altunin, given the impossibility of equal protection for all, priority for both shelters and evacuation would go to large cities and industrial installations. Small towns and rural areas, requiring protection against contamination only, would receive less extensive measures. Thus, Altunin apparently envisaged a blast shelter program for likely targets of nuclear attack, and fallout shelters for other areas.

reduce the effectiveness of a Soviet preemptive strike. At the same time, the procurement of large numbers of high-yield weapons by both sides made shelter protection extremely difficult in probable urban target areas. Consequently, civil defense through evacuation was closely tied to Soviet thinking based on strategic warning and preemption.

23. Since the 1960s, Soviet thinking has shifted more and more toward the view that a nuclear attack might occur with only a short period of prior warning. This coincides with the deployment of intercontinental ballistic missiles requiring few detectable preparations for launch. Writing in 1967, Marshal Krylov, then chief of the Strategic Rocket Forces, stated that high readiness of Soviet forces and the development of advanced reconnaissance systems meant that Soviet missiles "will have time during the flight of the missile of the aggressor to leave their launchers and inflict a retaliatory strike." Deviating from the usual stress on preemptive attack by Soviet military spokesmen, Krylov emphasized preventing an enemy disarming strike by launching Soviet missiles on warning that a US attack was underway. Similarly, the authoritative Soviet text *Military Strategy* (1968) concluded:

Soviet military strategy considers that, in contemporary circumstances, even a large war might arise suddenly, without the traditional threatening period characteristic of the past.

24. This shift in emphasis in Soviet thinking meant that much less time would be available for civil defense measures once war appeared imminent. Accordingly, the emphasis on civil defense preparations shifted to some degree away from evacuation to actions such as dispersal of industry and sheltering against surprise attacks. In 1974, the late Soviet Defense Minister Grechko warned that "the nature of contemporary war" would permit "too little time to organize retaliatory operations." He urged the taking of required decisions "prior to war." Marshal Grechko's warning was consistent with other Soviet writings which contend that in the final throes of its struggle against Communism, the West might attempt a "sneak attack." Soviet concerns about the period of warning prior to nuclear war may be based on a genuine fear of a hostile surprise attack, a fear perhaps heightened by the absence of strong US strategic defenses. Soviet concerns might also reflect expectations that the USSR itself might launch an attack under some circumstances with little advance preparations.

25. Although Soviet military theorists generally maintain that initial nuclear strikes would decide the overall course and outcome of a conflict, they still contend that a general nuclear war might extend for a protracted period, involving months or years of less intense, largely nonnuclear fighting. Because these writers expect both sides to suffer heavy losses from massive nuclear strikes, they note the need to mobilize forces and produce armaments during wartime. In this view, civil defense has acquired a "particular strategic importance" because it "makes possible the mobilization of armed forces during the initial period of war."

### III. CIVIL DEFENSE OBJECTIVES AND PLANNING

26. While we have considerable documentary information concerning objectives of the Soviet civil defense program, the sources vary in their treatment of the subject. The situation is similar in the matter of Soviet civil defense planning: what is revealed in open literature is not always what we believe are actual Soviet plans, which are invariably classified.

#### A. Objectives and Priorities

27. The Soviets' statements of their civil defense objectives vary in emphasis depending on the spokesman, the publication, and the intended audience. For example, an unclassified textbook<sup>9</sup> lists objectives in this order of priority:

- protecting the population from "weapons of mass destruction,"
- preparing the national means of production for "economic stability" (continuity of production) under conditions of enemy attack, and
- conducting urgent rescue and restoration operations at sites of destruction.

This listing of objectives is intended for use in civil defense courses taught in institutions of higher learning. It deliberately omits any reference to the place of civil defense in the broader framework of war survival as seen by the leadership and the military commanders responsible for the civil defense program.

28. The most comprehensive statement of the objectives and tasks of civil defense available to us is in the February 1974 article by General Altunin (see paragraph 20 in Chapter II of this memorandum).

<sup>9</sup> Yegorov, Shlyakov, and Alabin, *Civil Defense*, Moscow: Vyshaya Shkola, 1970.

General Altunin's article was published more than two years after he became head of the civil defense organization and its incorporation into the command structure of the Ministry of Defense. During that period he had sufficient time to formulate civil defense objectives and priorities according to the policies of the leadership. It is significant that while Altunin refers many times to protection of the civilian population, he lists three basic aims of civil defense as those of ensuring:

- "normal activity of all the country's agencies of leadership during a war."
- "successful operations by the armed forces," and
- "effective functioning of the economy" in wartime.

To this end, the Soviet civil defense organization has three fundamental objectives. While Soviet writings are not clear about the relative priorities of these objectives, evidence on actual civil defense preparations indicates that they fall in the following order:<sup>10</sup>

- protection of the Soviet leadership: key civilian (party and government) and military personnel at the national and local levels needed to assure the operation of government and the armed forces during and after nuclear war;
- protection of the economy and the essential work force: workers and employees of communal services, industrial facilities, and other economic enterprises that must continue to function in wartime; and
- protection of the nonessential element of the population.

#### B. Planning

29. Documentary materials on Soviet civil defense are of several categories. Writings of Soviet spokesmen contain statements of civil defense policy and descriptions of programs. These are often propaganda articles exhorting the reader to greater participation in civil defense. By far the largest body of materials comprises basic textbooks and manuals covering all details of civil defense preparations ranging from general descriptions of the civil defense program to detailed technical specifications for shelter construction. These unclassified textbooks and manuals have

<sup>10</sup> See Figure 1 for a listing of programs associated with these priorities.

often been incorrectly referred to in publications in the West as Soviet civil defense plans. While we have evidence of what the civil defense plans at various organization levels should contain, we do not have copies of any actual classified civil defense plans.

30. To satisfy priority objectives, Soviet planning calls for hardened facilities, together with extensive supporting communications facilities, to permit key government personnel to function during nuclear attack. Planning to provide for what the Soviets term the "stability of industry" calls for the protection of essential personnel through sheltering and dispersal, hardening of industrial equipment, and stockpiling of critical industrial and agricultural commodities. According to Soviet plans, both sheltering and evacuation are required for the protection of the general population—that part of the population deemed nonessential to the continuity of vital wartime preparations and to rescue and restoration operations. The training program emphasizes civil defense task organizations, but still calls for training and indoctrination of the general population.

31. Soviet civil defense planning is aimed at protecting the "rear areas" which in modern war "extend practically to a nation's entire territory." Hence Soviet civil defense planning covers all aspects of national life. It provides not only for the protection of people, but also for a manpower and economic mobilization system with strategic reserves of food and materiel to function under conditions of nuclear attack. It follows then that civil defense is an integral part of planning by party, government, economic, and military organizations at all levels. The national civil defense plans are prepared within the Ministry of Defense by the staff of the civil defense organization headed by General Altunin. At the Moscow level, civil defense planning appears to be geared to General Staff plans for the conduct of war and to the mobilization programs of each of the ministries, state committees, and governmental entities at the level of the Council of Ministers.

32. Below the level of the Ministry of Defense, the military districts are responsible for preparation of civil defense plans for their areas of jurisdiction. In each military district, the deputy commander for civil defense, working with the oblast and republic civil defense headquarters, is responsible for preparing plans which

- reflect the wartime tactical mission at the military district,

Figure 1. Priorities and Programs of Soviet Civil Defense

PRIORITIES	PROGRAMS
Survival of Party and Government	<ul style="list-style-type: none"> <li>● Hardened shelters near headquarters and at isolated relocation sites</li> </ul>
Protection of the Economy, Workers, and Scientific-Technical Personnel	<ul style="list-style-type: none"> <li>● Hardening of plant facilities</li> <li>● Dispersal of new industry</li> <li>● Shelters for essential and on-duty personnel</li> <li>● Dispersal of workers</li> <li>● Specialized training for CD units</li> <li>● Personnel provided with protective equipment</li> </ul>
Protection of the General Population	<ul style="list-style-type: none"> <li>● Urban evacuation</li> <li>● Basements and other shelters in urban areas</li> <li>● Expedient shelters in rural areas</li> <li>● Training and indoctrination</li> <li>● Self-provided protective equipment</li> </ul>

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- provide for the effective functioning of the military and civilian components of the civil defense organization.
- provide for the continuing operation of those elements of the economy in the military district whose production or services are deemed essential, and
- provide for coordination of the operations of civil defense organizations and regular troop units.

33. While we have not had access to a military district civil defense plan, we do have evidence of the type of subjects covered, such as:

- traffic control of road and rail movement by civil defense forces, regular military units, and elements of the urban population being dispersed or evacuated;
- allocation of alternate communication facilities for government leaders and for civil defense operations;
- medical assistance facilities;

- transfer of independent sources of power (mobile power plants) to civil defense engineering services; and
- designation of stockpiles and reserves under military district control which can be made available to civil defense components.<sup>11</sup>

34. Management of civil defense is similar to that in many other areas of Soviet administration. Authorities of the individual republics oversee the overall effort within their borders, but the oblast<sup>12</sup> (or kray) is the level which translates directives from higher echelons into precise plans for implementation by the civil defense staffs of cities, rural rayons, and industrial installations within its territory. In turn the civil defense plans of cities and towns represent an amalgam of the plans of individual enterprises and of community services such as firefighting, first aid,

<sup>11</sup> These examples were taken from discussions of combined military-civil defense planning contained in an article by Lt. Col. Ye. Galitskiy in the April 1968 *Military Thought*.

<sup>12</sup> The USSR is a federal state composed of 15 separate national republics. Most republics are further divided into oblasts or krays (provinces).



engineering (public utilities), and public order which are essential to rescue and restoration. Plans of cities and towns are coordinated with the local military garrison commanders, military commissariats,<sup>13</sup> departments of the militia and the Committee for State Security (KGB), local fire brigades, and other entities. Each of these organizations will play some role in peacetime civil defense preparations and wartime operations.

35. At the lowest level are civil defense unit plans and plans of individual economic facilities. Plans of economic facilities are classified but would normally include:<sup>14</sup>

- identification of essential and nonessential workers;
- plans for the movement of essential workers at the facility, together with their families, to dispersed locations and for the evacuation of nonessential workers and their families to locations more distant from the facility;
- provisions for shelter and cover (from weapon effects) for workers (and/or families residing in facility housing);
- a plan for converting the facility to wartime production, according to national defense needs;
- a program for training workers (and families resident in housing of the facility) to use individual means of protection;
- a plan for organizing administration, warning procedures, and communications at the facility;
- a schedule for executing basic civil defense measures for the facility;
- a plan for carrying out rescue and emergency restoration work at the facility; and
- measures for protecting food supplies, forage, and water supply sources from radioactive and toxic materials and biological agents.

36. Detailed planning is essential to the conduct of civil defense operations, but we are uncertain about the quality of Soviet planning. One objective in subordinating civil defense to the military was to

<sup>13</sup> The local military commissariat is part of a system to administer manpower mobilization, and to determine the wartime assignments of all those liable for military service.

<sup>14</sup> Yegorov, Shlyakov, and Alabin, *op. cit.*

alleviate deficiencies in planning but we cannot determine the extent to which its quality has proved successful. We do know, from evidence provided in Soviet exercises, that the Soviets are attempting to resolve planning deficiencies.

#### IV. ORGANIZATION AND FUNCTIONS

37. Case histories of wartime and peacetime disasters in urban areas all show the vital contribution of planning in saving lives and property. In these cases the most important elements in determining the success of rescue and restoration operations were the nature of the rescue organization, its level of training and the degree to which it was recognized by those in the disaster areas as the source of authority. In some instances, military personnel quickly introduced into the stricken area, even without much prior disaster planning by the community, served to reduce casualties and destruction. The military provided through its rank structure and uniform a visible organization and an accepted authority.<sup>15</sup>

38. In addition to the normal peacetime government organization in the USSR, a publicly recognized, highly structured, military-controlled civil defense organization exists for the specific purpose of providing leadership for preattack evacuation and dispersal and postattack rescue operations. The existence of such an organization probably assures that the Soviet public would respond as directed during wartime. Accounts of urban disasters suggest that any stifling of individual initiatives would be offset to a great extent by the advantages of advance preparations and the existence of a standing well-trained organization to take over in an emergency.

39. Most Soviet open-source literature gives an incorrect impression of a primarily civilian civil defense structure. The present Soviet civil defense organization and functions are basically military, although there is extensive civilian participation. In this connection, we note Soviet efforts to obtain international recognition of the legitimacy of military participation in civil defense operations. Recently, at an international conference in Geneva on humanitarian law in armed conflicts, the Soviets proposed that military units assigned to civil defense be accorded the same protected status as civilian civil defense person-

<sup>15</sup> Anderson, William A., *Military-Civilian Relations During Disaster Operations*, Ohio State University: Disaster Research Center.

nel. The Geneva proposal was the first to include the military in what international law considers strictly civilian functions. This is an indication of the importance the Soviets ascribe to the role of the military in civil defense.

40. The relative lack of unclassified material on the military aspect of civil defense is consistent with the secrecy surrounding all things military in the USSR. Unfortunately, much of our information is derived from unclassified documentary sources and from civilians, tending to emphasize the nonmilitary side of civil defense. Furthermore, in the past we have given relatively low priority to collection of intelligence or analysis of the organizational aspects of Soviet civil defense. We are confident in our assessment of the military subordination of the Soviet civil defense organization, but we are uncertain about operational relationships between civil defense organizations and elements of the five Soviet military services.

#### A. Peacetime Structure

41. In the past quarter century, as discussed in Chapter II, civil defense has been shifted among ministries and has undergone a number of organizational changes in response to fluctuations in official interest in civil defense and to shifts in strategic thinking. From a local organization with tenuous centralized control, civil defense became centralized at the national level under the Council of Ministers of the USSR in the 1960s with Marshal Chuykov at its head.

42. Under this arrangement, from the Moscow level downward, the chain of administrative and operational command over civil defense organizations proceeded along two separate but interconnected lines. The first proceeded from the Chief of Civil Defense, under the Council of Ministers, through the capitals of the union republics to subordinate administrative units. A second chain of command proceeded from the Ministry of Defense to each military district, where a civil defense department was established, headed by the Deputy Commander for Civil Defense. Disagreements within and between the military and civilian elements of this structure, and difficulties in coordination of planning and operations occurred at each organizational level despite efforts by Chuykov to resolve problems associated with the quality of command relationships.

43. During the 1960s, it was argued that civil defense is part of military science and strategy, that it

is part of the overall strategic defense of the rear, that it is essential for the support of military operations, and that it should be completely subordinate to the military establishment. Accordingly, in 1971, when the Ministry of Defense was made directly responsible for civil defense (see Figure 2), it "focused all matters involving protection against imperialist aggression in a single organ, the USSR Ministry of Defense."<sup>16</sup> This 1975 statement reiterated the 1974 declaration by Army General V. G. Kulikov, Chief of the General Staff: "In coordination with all branches of our armed forces, and under a single military command, it [civil defense] ensures the vital activities of the state under conditions of modern warfare."<sup>17</sup>

44. Despite these statements and various references in the open literature to daily involvement in civil defense by the General Staff, the military districts, and other commands, there are few specifics in unclassified material on precisely how the Ministry of Defense exercises its control. Open sources state that, below the MOD, direction of civil defense is exercised, as in the past, by civilian chiefs of civil defense who are the chairmen of councils of ministers and of executive committees of soviets (governing councils) and by the heads of ministries, departments, associations, and installations of the national economy. These civilian chiefs direct civil defense through staffs and services of civil defense. Direction of these organizations by the MOD is said to be carried out by Deputy Minister of Defense Altunin through his "subordinate control apparatus."<sup>18</sup> But no detail is given in these public statements concerning the nature of this apparatus.

45. From intelligence sources, it is apparent that the "subordinate control apparatus" referred to by Altunin is the military district structure and that actual responsibility for directing civil defense activities below the MOD level lies with the commanders of military districts and their deputies for civil defense, who are supported by departments of civil defense. The civil defense staffs of union republics continue to play an important role, however, by ensuring that governmental and economic organizations on their territory implement civil defense programs promulgated by the Ministry of Defense and military district authorities (see Figure 2).

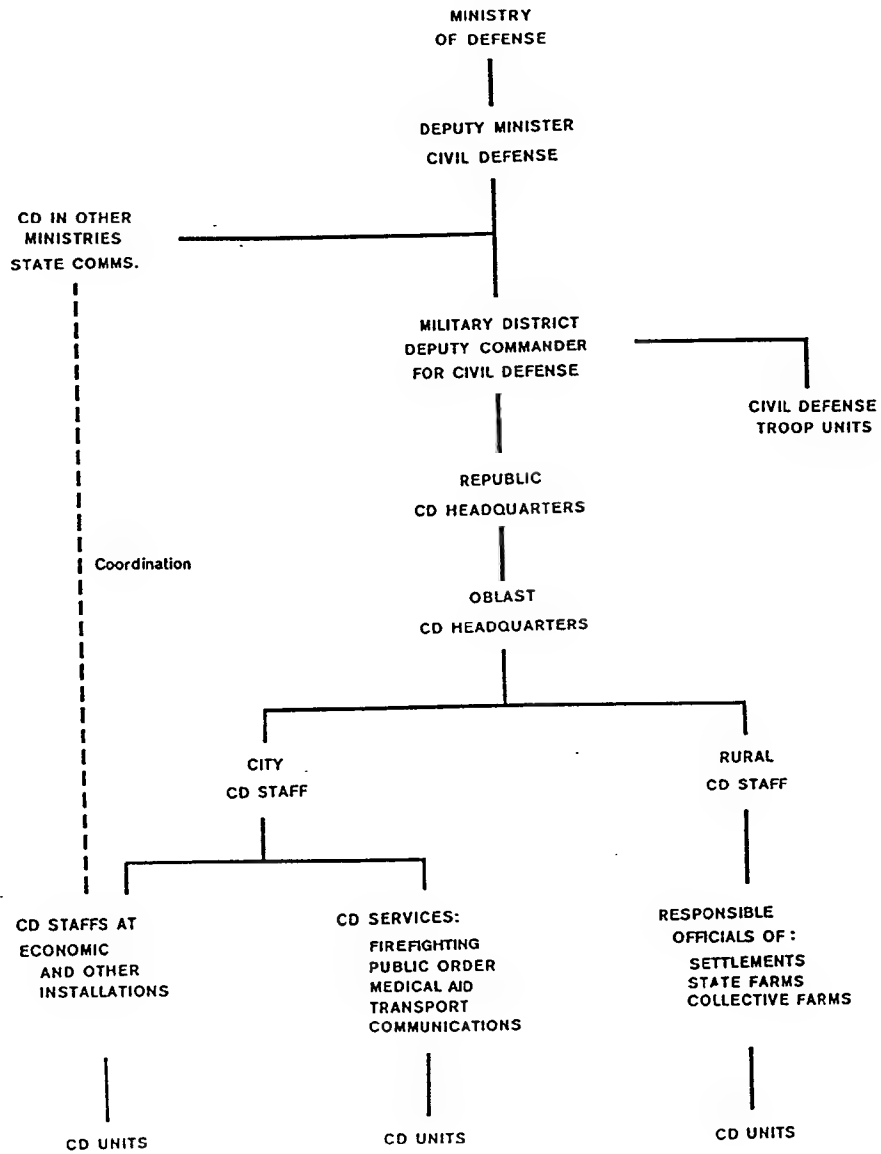
<sup>16</sup> Kotlukov, Ogloblin, and Sgilevskiy, *Civil Defense in the Past and Present*, Moscow: Atomizdat, 1975.

<sup>17</sup> V. G. Kulikov, "A Great Nation's Cause," *Voyennyye Znaniya*, No. 5, 1974.

<sup>18</sup> Kotlukov, Ogloblin, and Sgilevskiy, *op. cit.*

Figure 2. Organization of Soviet Civil Defense

The Soviet civil defense organization is directed by the Ministry of Defense through its Civil Defense Staff.



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46. The Russian Soviet Federated Socialist Republic (RSFSR) presents special organizational problems because of its size. Until about 1971, civil defense "operational zones" served as intermediate commands between the RSFSR Civil Defense Staff and the staffs of lower administrative units. The boundaries of these zones did not always coincide with those of the military districts located within the RSFSR. This arrangement did not appear consistent with the new organization placing military district commanders in the first echelon below Moscow in the civil defense structure. It appears that the zonal system in the RSFSR was undergoing certain organizational changes in 1972 as part of the shift to military control, but we do not know what changes were actually made.

47. Within each of the union republics the civil defense effort is managed by a civil defense staff, headed in each case by a general officer. Below this level are oblast, city, and rayon civil defense staffs, the more important of which are headed by active-duty military officers (see Figure 3). Subordinate to them are the operational services, formations, and teams directly engaged in civil defense activities. Economic installations and other places of work and study located within cities and rural rayons also have civil defense staffs. These staffs are often headed by retired or reserve military officers. The chairman of the council of ministers of each republic and at lower levels the chairmen of the local soviets are also responsible for compliance in their areas of jurisdiction with civil defense directives issued from higher echelons of the organizational structure.

#### *Civil Defense Staffs, Services, Formations, and Teams*

48. In general, civil defense staffs are charged with planning, coordinating, and implementing civil defense programs. Civil defense planning in the military district is based on local requirements and coordinated with military mobilization and operations plans. At the oblast and city levels (see Figure 3) planning is done by the chief of the civil defense staff and coordinated with the military garrison commanders to ensure that it is consonant with the wartime missions of the troop units located in the area. At the rayon level and at individual installations, the chiefs of civil defense coordinate with military commissariats (local military mobilization organizations) in determining their personnel requirements to man civil defense formations. Local plans are approved by the deputy commander for civil defense of the military district,

then coordinated with the local party, government, and economic leaders.

49. Actual civil defense wartime operational tasks are carried out by the civilian services, formations, teams, and military civil defense troops, possibly augmented as needed by regular military units. Services, formations, and teams are organized at the oblast and city levels and in rural areas. Their duties are to protect city installations and to perform rescue and repair work. Below the city level, formations at economic enterprises are responsible for protecting the installations' facilities and workers. In addition to performing civil defense operations in rural areas and providing for city evacuees, rural civil defense teams would also supplement urban civilian formations in their postattack operations.

#### *Civil Defense at Economic Installations*

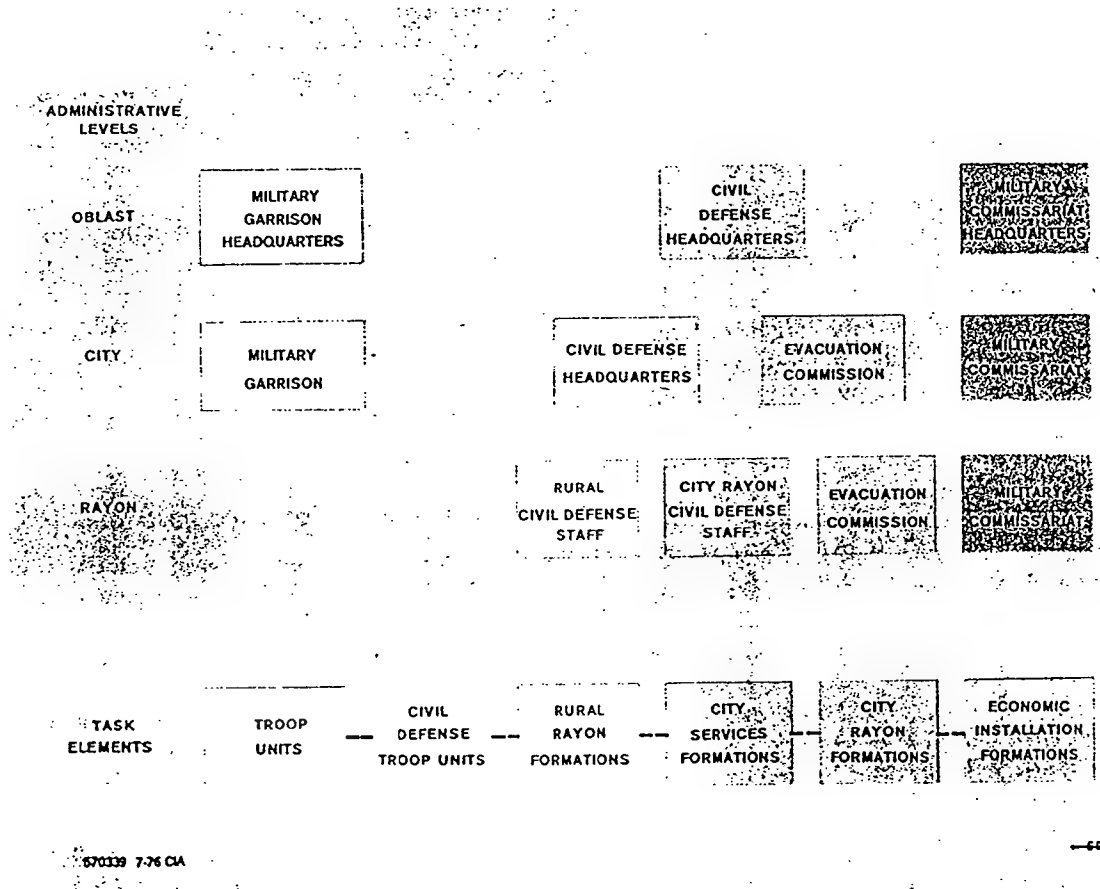
50. The nature of civil defense activities at economic installations is dependent largely on the importance of the activity to a war economy. At the national level, economic ministries coordinate their civil defense activities as presented in the production plans with the Civil Defense Staff and with Gosplan.<sup>19</sup> At lower levels, planning is done on a yearly basis and coordinated with the appropriate local civil defense headquarters.

51. Altunin has stated clearly that civil defense measures should give priority to industries essential to a war effort. Human sources have confirmed that varying degrees of emphasis are placed on civil defense at places of work. Thus, industries of vital military importance would tend to have a large and well-organized civil defense staff, whereas industries of no strategic importance would have a less sizable civil defense effort. The trend in recent years, however, has been to extend the system to an even larger number of industrial installations. Current reporting describes active civil defense organizations at some plants that we would regard as having little importance in wartime.

52. At the plant level there is usually a civil defense coordinator and a staff, composed mainly of shop managers or foremen. Among their functions are training, planning for evacuation, and organizing civil defense teams for functions such as firefighting, decontamination, rescue, repair, and first aid. It is these formations that have the task of protecting the facility.

<sup>19</sup> Gosplan is the State Planning Committee.

Figure 3. Soviet Civil Defense Organizations at Oblast, City, and Lower Levels



*Military Civil Defense Troops*

53. Military civil defense troops, created in the early 1960s, are organized at the military district level. Military civil defense units are responsible for reconnaissance in contaminated areas, for clearing debris, for reopening roads, and other civil defense activities for which the civilian formations have neither the required equipment nor the experience.

54. Each military district has one or more military civil defense units of regimental size. These units are usually located near important cities and major industrial centers; their organization, equipment, and strength vary depending on their location. Some of the identified regiments (see Table I and Figure 4) consist of two battalions with five companies each: communications, chemical, mechanized equipment, motor transport, and construction. There are also several platoons assigned to firefighting, engineering, and

tank reconnaissance. Recent evidence suggests not only that civil defense troops have their own organic communications, but also that there are independent communications units (see paragraph 65).

**B. Wartime Structure**

55. We lack precise information on the extent to which peacetime civil defense responsibilities, organization, and chain of authority would change during wartime. Such evidence as we do have, however, on Soviet civil defense concepts, the peacetime civil defense structure, and planned civil defense operations, suggests that under wartime conditions all civilian organizations contributing to civil defense would be subordinate to the military district commanders. These arrangements, considering the scope of civil defense activities during wartime, would amount to military control over practically all aspects of Soviet life. Such control by the military would be

consistent with the Soviet concept that civil defense is part of military operations in wartime—that an effective civil defense system is essential to military mobilization and to successful combat operations of the armed forces.

56. To supplement civil defense troops, it is likely that other ground force units of the military district, such as engineers, would be designated to carry out civil defense tasks. We are uncertain about the role of the other arms and services in civil defense operations. For example, it is probable that civil defense elements rely on PVO units for warning and communications support, but there is no firm evidence on how this functions. We also believe that in wartime the local militia, the KGB, and internal security troops, supplemented by military units as necessary, would be subordinated to the military district commanders to maintain public order.

57. The wartime organization and interaction among elements involved in civil defense activities would depend on the tactical situation. During a recent natural disaster in Odessa, the task organization was composed of oblast civilian formations and military units. The activities of civil defense organizations were directed from an emergency headquarters set up at the oblast executive committee under the oblast civil defense chief. Officials of the headquarters also included the oblast and city government and party leaders. Formations operating under military officials of the oblast and city civil defense staff were set up to inform and mobilize the population and to coordinate activities among civilian and military civil defense organizations and other military units. Special brigades were formed on an ad hoc basis and placed under control of the emergency headquarters of the oblast. The assistance given by military units was reportedly extremely valuable, providing experienced manpower and equipment. The availability of regular military units for civil defense duties during wartime would depend, of course, on their tactical combat mission.

### C. Manpower

58. Intelligence sources have provided valuable but fragmentary data on the strength and location of civil defense military and civilian units. The manpower figures for the staff organizations shown in Table II are minimum figures. For example, the figures include only professional staff members; they do not include staff administrative and support personnel. Also, the table omits any figures for full-time civil defense

personnel at individual economic installations. While we have extensive evidence that there are such personnel, we have no basis for aggregating the total.

59. Assuming that the administrative and support manpower in the civil defense staffs is at least equal to the number of professionals—some 16,000—shown in Table II, the total number of full-time civil defense personnel could approach some 50,000 without taking account of the full-time civil defense manpower at economic installations. We are certain, moreover, that there are more full-time civil defense communications personnel than the 600 shown in the table. It is emphasized, therefore, that the 50,000 figure probably represents less than the actual number of people engaged full-time in civil defense in the USSR.

### *Military Civil Defense Manpower*

60. *National Headquarters.* Eleven general officers have been identified at the Civil Defense Headquarters for the USSR. It is assumed that at least six more are heading other directorates and departments. The size of the staff organizations headed by these officers is unknown, but a minimum of 15 staff members to a general officer would be reasonable for the administration of the nationwide program.

61. *Military Districts.* As of the mid-1960s, the civil defense "department" at the military district level had some 20 to 25 staff personnel. It is not known whether civil defense was upgraded to a "directorates" and its staff increased after the reorganization in the early 1970s. Under Soviet practices, a change from a department to a directorate would imply a doubling of the manpower. The greater responsibilities of the military districts under the latest reorganization would also imply an increase in manpower.

62. *Civil Defense Academy.* Since 1969, junior military officers have been graduating from the Civil Defense Academy at Balashikha. Neither the size of the staff nor the number of graduates has been revealed publicly. An estimate of the number of graduates can be made, however, based on the number of junior officers assigned to each regiment in the field. An emigré who served in three civil defense regiments heard that three to four newly graduated officers were assigned to regiments annually. Assuming all graduating officers are assigned to regiments, the four-year academy should graduate at least about 100 officers a year. In addition there have been several references to Higher Central USSR Civil Defense Officers Courses. Neither the size of the school nor its participants have been determined.

TABLE I  
Identified Civil Defense Units in the USSR <sup>1</sup>

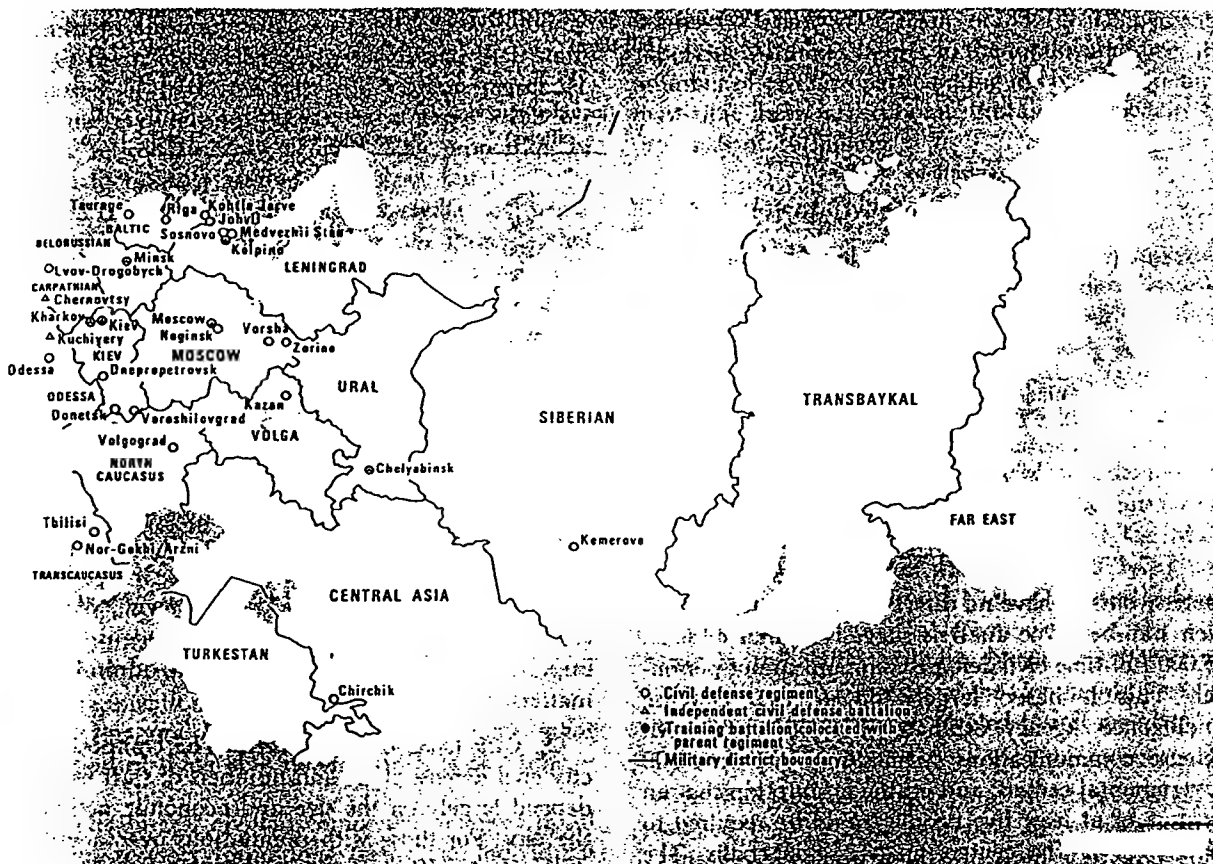
<u>Location</u>	<u>Strength (Where Reported)</u>
<i>Regiments</i>	
Lvov-Drogobych, Ukraine .....	380
Volgograd, RSFSR .....	800 (3,500 in wartime) <sup>2</sup>
Taurage, Lithuania .....	220-250 (1,200 in wartime) <sup>2</sup>
Chirchik, Uzbek SSR .....	1,500-2,000
Leningrad, RSFSR .....	—
Sosnovo .....	870
Kolpino .....	220
Medvzhii Stan .....	—
Vorsha, RSFSR .....	250
Minsk, Belorussia .....	600
Moscow (1), RSFSR .....	—
Noginsk .....	—
Kharkov, Ukraine .....	200
Dnepropetrovsk, Ukraine .....	—
Donetsk, Ukraine .....	1,000
Kohtla Jarve, Estonia .....	—
Odessa, Ukraine .....	—
Riga, Latvia .....	—
Kazan, RSFSR .....	—
Chelyabinsk, RSFSR .....	—
Voroshilovgrad, Ukraine .....	—
Kemerovo, RSFSR .....	—
Zorino, RSFSR .....	800
Tbilisi, Georgia .....	—
Kiev (2), Ukraine .....	250
Nor-Gekhi/Arzni, Armenian SSR .....	—
Johvii, Estonia .....	—
<i>Training Battalions Colocated With Parent Regiment</i>	
Kharkov .....	—
Moscow .....	—
Kiev .....	—
Leningrad (Kolpino) .....	—
Minsk .....	—
Chelyabinsk .....	100
<i>Other Battalions</i>	200-250
Kochiyery, Moldavia .....	—
Chernovtsy, Ukraine .....	—

<sup>1</sup> Locations of these units are shown in Figure 4.

<sup>2</sup> All civil defense units would be heavily augmented with reservists in wartime.

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Figure 4. Locations of Identified Soviet Civil Defense Units



63. *Civil Defense Troops.*<sup>20</sup> An estimate of the strength of civil defense troops is very difficult to formulate because the evidence suggests that the strengths of the units vary depending on the location of the regiment and the importance of the area they protect. Most of the regiments are reportedly in cadre status, that is, containing only a nucleus of officers and men. These cadres would be expanded to their full manpower complement during mobilization or an emergency. Some battalions may become regiments and regiments divisions in a full wartime mobilization and deployment. The additional manpower would be supplied by reservists.

64. The strengths of cadre units as often estimated by human sources range between 200 to 250 men. Although there is no information as to the size of a full civil defense regiment, there have been several references to the units composing a regiment. The regiment in Chirchik (an earthquake-prone area)

<sup>20</sup> Officers and men in training units excluded.

offers the best example of what may be a full unit, with a total strength of about 1,850 men. Since it is not known how many units are at cadre or full strength, an average of the identified regimental manpower figures was computed. On this basis, the estimated average strength of a regiment is 655 officers and men.

65. In addition to the regiments of civil defense troops, there are independent communications units subordinate to civil defense, manning communications at civil defense staff centers. A few reports have estimated the strength of the companies serving two republic civil defense headquarters to be between 30 to 50 officers and men. Assuming that companies of similar strength serve at other republics headquarters, there would be an additional 450 to 750 men at this level. This is the basis for the figure of 600 communications troops appearing in Table II. There are almost certainly more full-time communications personnel operating stations at lower echelon staff



TABLE II  
Professional Personnel on Soviet Civil Defense Staffs  
(full-time)

	Military (includes reserve officers)	Civilian	Total
Staff Organizations			
National .....	250		250
Republic .....	330	50	380
Oblast .....	1,200	600	1,800
Cities .....	1,600	6,400	8,000
Rayon .....	3,000	3,000	6,000
<b>Total for Staff Organizations .....</b>	<b>6,380</b>	<b>10,050</b>	<b>16,430</b>
Military Districts .....	400		400
Civil Defense Troop Units .....	17,000		17,000
Communications Troops .....	600		600
Academy .....	400		400
<b>Total .....</b>	<b>24,780</b>	<b>10,050</b>	<b>34,830</b>

centers, but we have no direct current evidence as to their number. One analysis suggests a total of some 15,000 full-time civil defense communications personnel. This is based largely on a 1972 Defense Intelligence Agency estimate that dedicated civil defense communications systems serve up to 3,000 governmental centers, and on the assumption that an average of at least five people would be required to man each of the centers on a 24-hour basis. The analysis also made allowance for heavier manning at the numerous bunkered communications facilities described in Chapter V of this memorandum. We do not know, however, the extent to which most of these communications facilities are currently manned.

66. *Republic Civil Defense Staffs.* General officers serve as chiefs of staff for civil defense at the republic level. Colonels have been identified as deputy chiefs, and majors as assistant chiefs for propaganda, political affairs, and combat training. Although there is no information on the size of the staff, it is known that it is composed mainly of active, reserve, and retired military personnel. Considering the duties of a republic civil defense staff, it is estimated that a staff of 17 other officers would be a minimum requirement. The figures given here do not account for the possibility of a zonal staff for the RSFSR or any other kind of organizational arrangement in the large republic.

67. *Oblast Civil Defense Staffs.* At the oblast level the chief of the civil defense staff is a colonel. The size of the organization and the extent of civil defense

activities at this level are not known. We have estimated a staff of at least ten, because of the importance of the oblast in overall administrative matters.

68. *City Civil Defense Staffs.* The composition of city civil defense staffs and numbers of staff members depend largely on the size and economic activity of the city. For those with populations over a million, staffs of six officers have been estimated. For cities having between 100,000 and 1 million people, an average of three officers per staff has been estimated; and for cities between 25,000 and 100,000, one staff officer.

69. *Rayon Civil Defense Staffs.* There is little information on the composition of the civil defense staff at the rayon level. While active-duty military officers may serve as chiefs of staff in some of the more important rayons, there are no indications as to how many officers would serve in this capacity countrywide. Two officers, either reserve or retired military, have been estimated for the rayon organization.

#### Civilian Civil Defense Manpower

70. In addition to military civil defense personnel, large numbers of civilians have civil defense assignments. In peacetime civilians man the staffs, services, and formations at administrative centers, economic installations, and other organizations on a full-time and part-time basis.

71. At the various governmental levels the chairmen of the respective councils of ministers or executive committees are responsible for civil defense. Subordinate to them are civil defense chiefs and their staffs, composed of both military and civilian personnel. Full-time civilian staff members at these levels are usually retired military officers. The proportion of civilian to military staffers is unclear, but it can be assumed that at the lower echelons, civilian participation will be proportionally higher. We estimate that three civilians, in addition to military personnel, serve full-time in the republic civil defense staff, five in the oblasts, between one and five in the cities, and one in the rayons.

72. At economic installations the director is the chief of civil defense, but it is the chief of staff at the installation who plans and coordinates civil defense activities. Depending on the importance of the installation, the chief of staff will be full-time or part-time.

73. A number of civilians also have responsibility for civil defense programs at institutes, schools, and other organizations. Because of fragmentary information it has not been possible to determine what proportion of these civil defense staffs is part-time.

74. The largest civilian component is made up of the many services, formations, teams, and individuals responsible for civil defense operations in wartime. The cadres are considered part-time personnel and are organized at oblasts, cities, and enterprises. Their numbers and strengths vary according to the size and importance of the localities and installations. The strengths of these civil defense organizations will be dependent on the way in which services at the oblast and city level make use of existing civilian and military structures for such needs as public order, medical care, and engineering services.

75. Overall civilian participation in civil defense formations has been estimated by human and other sources to range between 20 and 70 percent of the work force. As reported by the Central Statistical Administration of the Council of Ministers, the total labor force in the USSR was about 136 million in 1975. Assuming a minimum of 20 percent participation of the work force, the number of civilians involved in civil defense would be about 27 million.

76. In 1975 Altunin issued an order stipulating that for any economic installation of 300 to 500 people

there should be a rescue detachment<sup>21</sup> of 105 (or between 21 and 35 percent); for an organization under 300 people, a team of 35 (or 12 percent). Applying Altunin's figures to the total work force, the number of civilians participating in civil defense on a part-time basis at economic installations would be upwards of 16 million.

### *Quality of Civil Defense Personnel*

77. The leadership of the civil defense organization in the USSR is composed of a large number of general officers, many of whom have impressive qualifications. Colonel General Altunin, a relatively young (55) general in the MOD leadership, appears to be fairly active in military and political circles and is one of 14 deputy ministers (three of whom are first ministers). He has been trained at several military academies and has had combat experience. Before his appointment as Chief of Civil Defense, he was Chief of the Main Personnel Directorate of the MOD (1971-72) and served as Commander of the North Caucasus Military District (1968-70), and as Commander of the 11th Army in the Baltic Military District (ca. 1967). In 1976, at the 25th Congress of the Communist Party of the Soviet Union, he was elected to full membership on the Central Committee.

78. Many of the other general officers identified as assigned to civil defense appear to be high-quality officers. They have held important staff and command positions at the general staff level, in military districts, and in the groups of Soviet forces, as indicated in the listing below of the previous assignments of the most senior Soviet officers identified as assigned to civil defense:

<u>Current Civil Defense Leaders</u>	<u>Previous Assignments</u>
Colonel General Altunin	Chief, Personnel Directorate, Ministry of Defense Commander, North Caucasus Military District
Colonel General Chizh	First Deputy Commander, Kiev Military District Chief of Staff, Odessa Military District
Colonel General Turantayev	Chief of Staff, Group of Soviet Forces, Germany
Colonel General Grekov	Chief, Political Directorate, Belorussian Military District
Lieutenant General Vlasov	First Deputy Commander, Central Asian Military District First Deputy Commander, Northern Group of Forces

<sup>21</sup> A rescue detachment is a composite of the principal civil defense units at an organization or installation.

<u>Current Civil Defense Leaders</u>	<u>Previous Assignments</u>
Lieutenant General Kremenskiy	Deputy Commander, Soviet Armored Troops
Lieutenant General Dyatlenko	1st Deputy Commander, Moscow Military District

79. Among the republic chiefs of the civil defense staff there is a former chief of an overseas military advisory group and a deputy commander of the Kiev Military District. Other general officers have been identified only at their present post. In most cases, an officer of the republic's nationality is assigned as Chief of the Civil Defense Staff.

80. We have confirmed a total of 40 general officers assigned to civil defense at the national (11), military district (7), republic (19), and oblast or city (3) levels. This total is probably only about half of the total general officer billets.

81. An indication that senior civil defense officers are of high quality is that several have been promoted while serving within the civil defense structure. In May of this year a statement by Colonel General Grekov, Civil Defense Deputy Chief for Political Affairs, indicated the status of civil defense officers at the local level:

The fact that more than 300 Chiefs of Civil Defense Staffs were elected as members of local government councils during 1975 testifies to the growth of authority and public activeness of the Communist leaders of Civil Defense.

82. As for the quality and experience of military personnel in general, evidence from human sources is conflicting. Whereas the younger officers trained in civil defense have sufficient understanding of their duties to provide good leadership, older field-grade officers reassigned to civil defense from other branches of the armed forces, according to some reports, lack qualities of good leadership. We do not know what proportion of the officer corps has received adequate training, and we are uncertain about the overall quality of leadership, particularly that provided by the older field-grade officers.

83. Several reports have indicated that recruits for civil defense regiments are not among the first to be selected for duty. Sometimes, civil defense ranks six (out of seven) in the selection process. Thus, recruits having questionable backgrounds, disciplinary problems, or showing a general lack of skills are assigned to civil defense regiments. Nevertheless, in the few occasions that emergency civil defense operations

have been conducted, the soldiers seem to have performed well.

84. At the republic and lower administrative levels, the quality of staff personnel—especially military retirees—has been questioned by many sources. The ex-military men are thought to be filling an easy post, which does not require much effort and provides extra pay.

85. Civilian formations organized at economic and other installations are supposedly formed by personnel excluded from military duty. There are instances, however, in which participants are selected at random. The quality of the performance of these formations will depend to a large degree on the training these personnel receive and on the leadership provided.

86. In sum, the civil manpower appears to be a mixture of competent staff and others who show less ability. The quality of personnel as a whole is difficult to assess because of the many factors about which we do not have a clear picture, such as the quality of leadership, training, and motivation.

#### D. Command, Control, and Communications

87. The civil defense organization is supported by dedicated communications networks which are believed to link the CD Headquarters in Moscow with subordinate staff centers throughout the USSR. There are indications that at least at the republic level, independent communications units of the CD troops are responsible for manning these stations.

88. The civil defense troops, as a component of the Soviet military, are part of a communications network which serves a control and coordination function between the military district headquarters, CD units and other ground forces elements within the military district.

89. It is believed that the Ministry of Communications provides another network to be used as a backup in emergencies. It is possible that this system was considered necessary to provide communication links with those areas not covered by the dedicated network. Personnel manning these stations are presumed to be civilian.

90. The above networks serve primarily the peacetime communication needs of CD. It is believed that in wartime, other fixed and mobile communication

stations will also be available for civil defense purposes.

### E. Conclusions

91. In general, regarding the Soviet civil defense organization, we conclude that the present organizational structure is better suited than its predecessor to carry out Soviet objectives for civil defense. Control over civil defense by the military alone, rather than through a dual civilian and military line of authority, has advantages both for peacetime planning and wartime civil defense operations. Placing both civilian and military civil defense manpower and resources under military control assures an organization responsive to the needs of the armed forces as called for in Soviet military concepts. Some civilian officials may react negatively to military direction of their activities during peacetime. However, the centralization of civil defense under the military should facilitate peacetime preparations—developing plans, monitoring progress, and maintaining stockpiles.

92. The size of the Soviet civil defense structure, its vertical distribution within the political and military hierarchy, its leadership, and the facilities available or planned for its command and control appear adequate, from an organizational standpoint, to carry out Soviet civil defense plans and operations.

### V. PROTECTION OF THE LEADERSHIP

93. Protection of the Soviet leadership encompasses all the measures necessary to achieve one of the basic aims cited by General Altunin in his February 1974 article—i.e., to ensure "the normal activity of all the country's agencies of leadership during a war." Soviet classified and unclassified writings of the 1960s expressed growing concern about the survivability of the civilian and military leadership of the country and about command and control of Soviet military forces. These concerns have prompted the Soviets to construct hundreds of hardened facilities in and around the capital and throughout the country to serve the party, government, and military leadership. A program is underway to provide such facilities for civil defense headquarters at all levels. We have evidence of hardened facilities and supporting communications for civil defense leaders in the Moscow area and at other locations in the USSR, but we do not know the number and location of such facilities countrywide.

#### A. At the National Level

94. The standard pattern of the structures built to protect the leadership (depicted in Figure 5) is best seen in the Moscow area. Major party, government, and military headquarters (which includes civil defense) located in Moscow maintain emergency bunkered facilities in the city to which top leaders and commanders would repair if a nuclear attack occurred with minimum warning. For example, the Politburo and Central Committee are believed to have substantial reinforced concrete bunker space below the Kremlin and adjacent offices. These bunkers are reportedly linked with the Moscow subway. This is said to be the case also with underground facilities at the complex of buildings in downtown Moscow used by the Ministry of Defense and General Staff. Similar but less elaborate facilities are believed to exist for other key party, government, and military entities and for major civil defense headquarters.

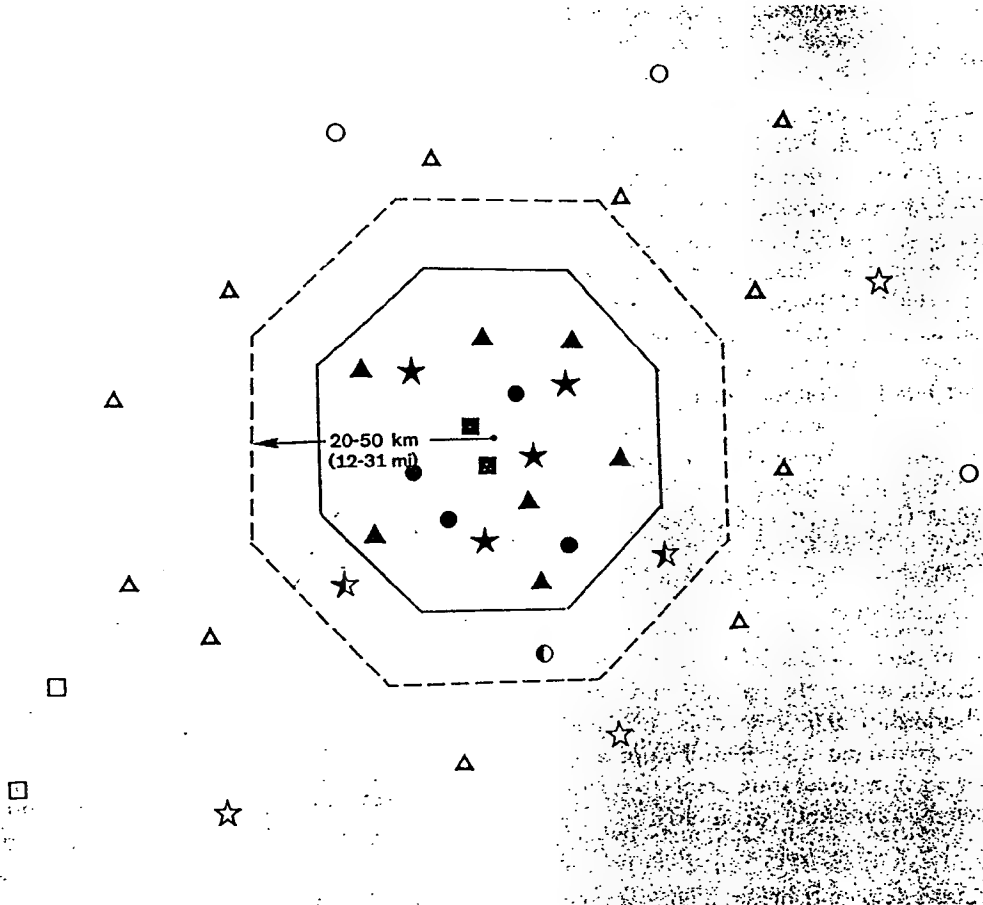
95. Outside the city the Soviets have constructed elaborate, alternate, bunkered command and control facilities for use by the top civilian and military authorities (see Figure 6). A large, rail-served, heavily bunkered facility near Sharapovo, some 50 kilometers (31 miles) south of Moscow [ ] has been tentatively identified as intended for the national political leadership. Its domed bunkers are assessed to have a 50-percent probability of sustaining severe damage at about 4,000 kilopascals (600 pounds per square inch)<sup>22</sup> from a one-megaton weapon. A comparable facility for the General Staff is the bunkered central command post at Chekhov, 12 km (7 mi) from Sharapovo [ ] With its five bunkers it may serve as an optional location for the politico-military leadership. A second alternate, rail-served command post for the General Staff and the political leadership with ten large bunkers is located at Chaadayevka, 560 km (347 mi) south of Moscow.

96. [ ]

[ ] Many additional bunkered command posts have been identified in the vicinity of Moscow, and there are others for which subordination has not been established. The latter could be related to civil defense. Most of the

<sup>22</sup> A kilopascal (kPa) is a term used in the metric system as a measurement of pressure. It is roughly equal to 100 times the value of one kilogram (force) of pressure per square centimeter of area. The equation used in converting from pounds per square inch (psi) is 6.89476 kPa = 1 psi.

Figure 5. Standard Pattern of Bunkered Command and Administrative Points for Wartime Protection of Soviet Leaders at National, Republic, and Regional Levels



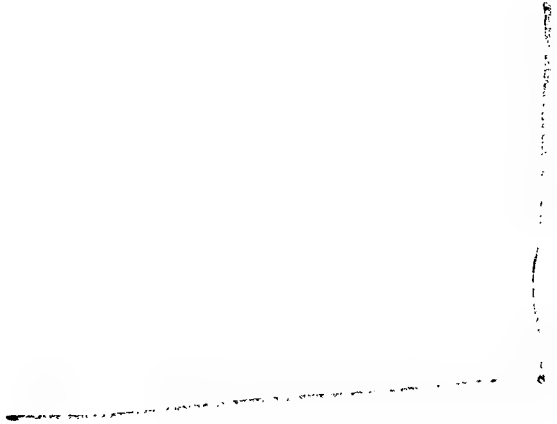
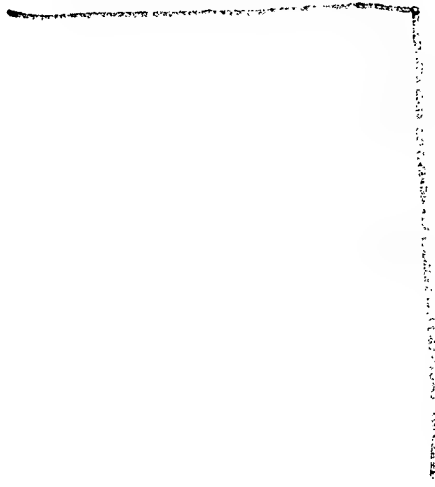
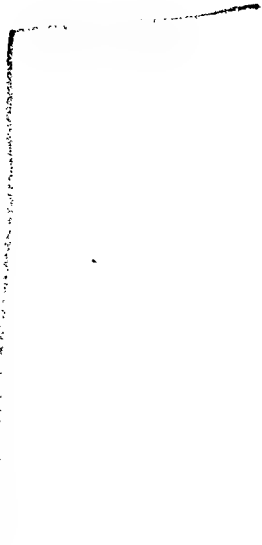
	<b>URBAN</b> Administrative HQS w/Bunkered Command Points for Emergency Use	<b>EXURBAN</b> Administrative HQS w/Bunkered Facilities	<b>ALTERNATE</b> Command Points
Top Party Government, Military Elements in Area	■	□	□
Ministries and other State Organs, i.e. KGB, MVD, Ministry of Communications	●	○	○
Military Headquarters Military Garrisons Major Commands	★	★	★
Civil Defense HQs and Staffs of Vital Services and Economic Installations	▲	▲	▲

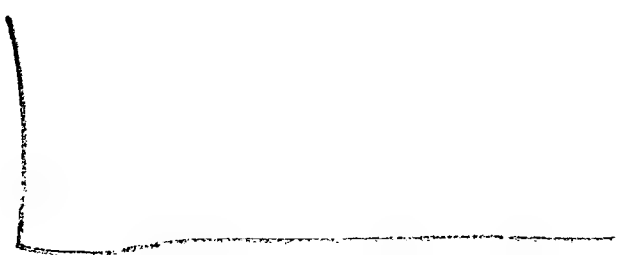
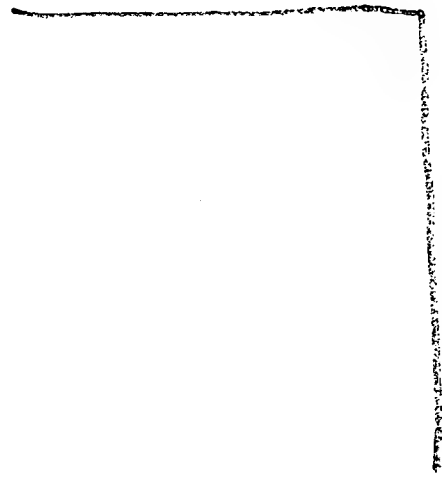
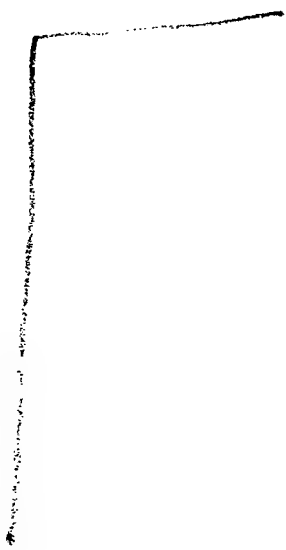
Identified primarily in Moscow area.

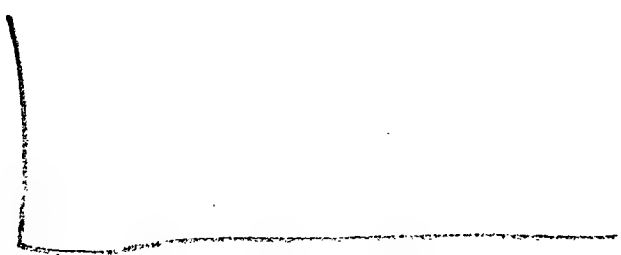
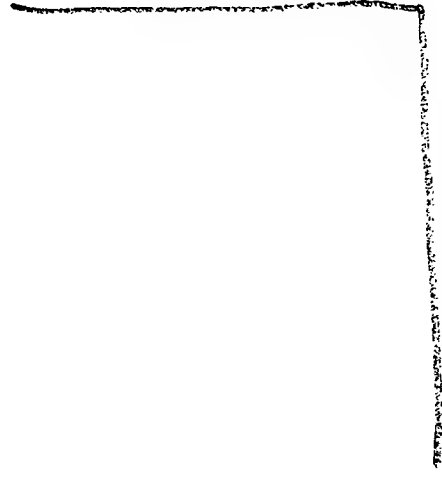
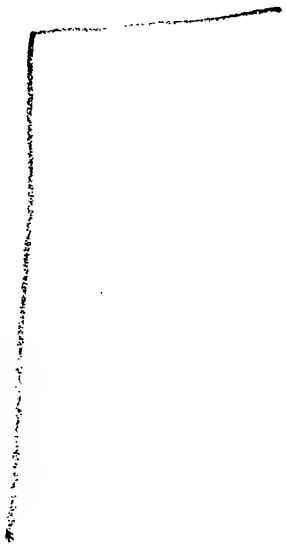
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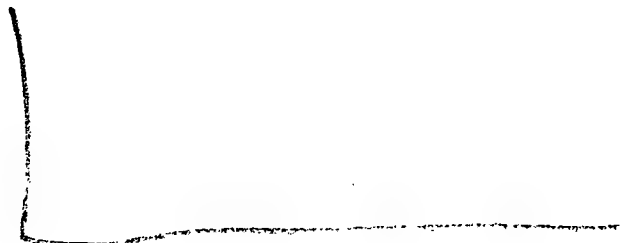
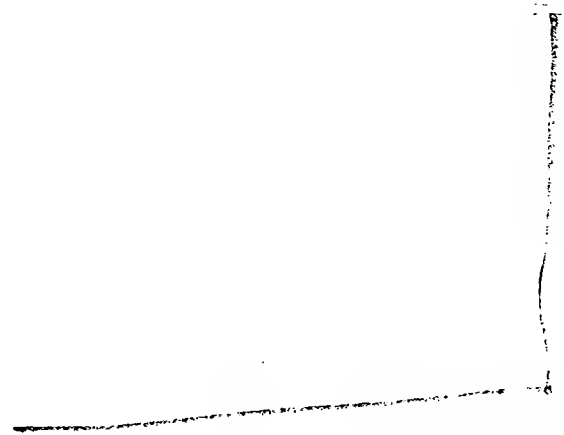
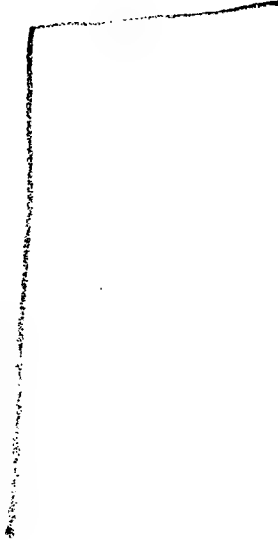
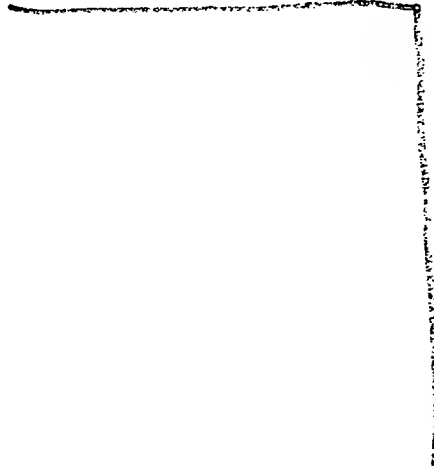
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command posts in the Moscow area are supported by buried antennas and bunkered communications facilities.

97. A third type of facility has developed over the last several years. These are sites located outside Moscow which combine the administrative headquarters of key government and military components above ground with bunkered facilities capable of serving as command posts in nuclear attack. Examples of this are the headquarters of the Strategic Rocket Forces and the Air Defense Forces as well as the First Chief (Foreign Intelligence) Directorate of the KGB

[redacted] The decisions to locate these components outside Moscow were most likely made for both administrative reasons (establishment of new commands, need for more space) and for enhanced survivability.

98. A number of other installations designated by US intelligence as "special civil facilities" resemble the combined administrative headquarters and bunkered command posts described above. We do not know, in most cases, by whom they are currently occupied. At least one, at Voronovo, 55 km (34 mi) south-southwest of Moscow, has been identified in open literature as a rest and resort area for Moscow workers.<sup>23</sup> Completed in 1973, it probably contains blast shelters built in accordance with the civil defense specifications issued by the State Construction Committee (Gosstroy) in 1969 and 1970. It may be that certain of these "special civil facilities" were built in conformity with the Soviet "dual purpose" concept calling for large complexes to be used for other than civil defense purposes in peacetime but to be converted to serve civil defense needs in wartime. For example, the 1970 university-level civil defense textbook, referring to civil defense aspects of urban planning, states: "The outer zone is used for large-scale recreation of the population and for locating medical and sports institutions." This description fits the Voronovo complex perfectly.

#### B. Below the National Level

99. The Moscow pattern appears to have been followed at some of the capitals of republics and large centers of administrative, political, military, and economic importance. They have similar underground facilities within the urban centers which are built in or adjacent to the administrative headquarters of key

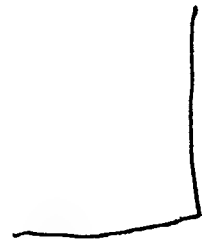
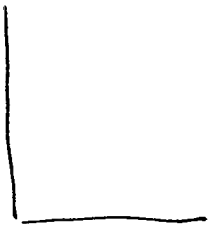
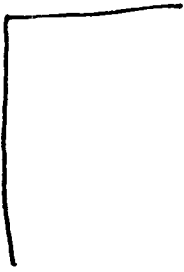
<sup>23</sup> *Stroitel'stvo i Arkhitektura Moskvy* (monthly journal of Moscow City Soviet Executive Committee), October 1972.

party, government, and military components. The most impressive of these are the party-government bunkers in Kiev on which work began in the mid-1950s and continued through the 1960s. As in Moscow, the extensive-shelter system in Kiev, with its own communications facilities, is also tied in to the local subway. Another example of a similar in-town underground facility at a smaller yet important city is the reported government bunker at Simferopol' on the Black Sea. The facility is built into a hill located directly across from the city's civil defense headquarters. It is fully equipped and furnished and is large enough to permit continuation of government activities in case of nuclear attack.

100. As in the Moscow pattern, republic capitals and other large centers have alternate command posts for both civilian and military command authorities located at distances of from 10 to 20 km (6 to 12 mi) from the cities. They are large, underground, multi-storied facilities to which key leaders would repair upon warning of impending attack. These alternate command posts are well equipped to ensure survival in a nuclear environment. They have extensive communications facilities manned by civil defense communications units and, according to human source reports, have extensive stores, including moth-balled vehicles, to permit operations during nuclear attack and to enable them to serve as sites from which poststrike recovery activities would be directed. Such facilities have been reported in the vicinity of the Armenian, Belorussian, Lithuanian, and Ukrainian capitals. In addition, a rest home approximately 96 km (60 mi) south of Kiev has been identified by human source reporting appears to be a "dual purpose" dispersal facility. This spread suggests similar facilities exist in other republic capitals and elsewhere in key cities, but we have not yet identified them.

101. Up to the early 1970s, available evidence suggested that the pattern of in-town underground bunkers and bunkered, alternate command points in the environs of capital cities was limited to the highest level party and government organs and to principal military commands, with the latter possessing the largest number of such facilities. By 1970-71, however, at the initiative of Soviet civil defense officials, the pattern was standardized and broadened to include many more elements of the party, government, and national economy at the level of the oblasts and cities. The 1969-70 decrees of Gosstroy which standardized the specifications and procedures for constructing

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personnel blast shelters in urban areas and industry<sup>24</sup> also provided for standard bunker-type command post shelters. This type of shelter contained space intended for communications equipment as well as offices. Command-post bunkers, whether in town or at alternate locations out of the city, were normally of the detached type, although some of the built-in variety may serve as emergency command posts in town.

102. Thus, a standard pattern (as previously shown in Figure 5) of hardened facilities is emerging, confirmed by intelligence, sources, to ensure the survival and continuous functioning of key party, government, and military and economic personnel down to city levels. In addition, current open literature describing exercises simulating nuclear attack makes frequent reference to the role of the bunkered command posts for the key personnel of various organs. In general, the degree of sophistication and the redundancy of these facilities depend on the importance of the locality. The evidence shows, however, that organizations and installations with what might be considered to have only modest priorities have had constructed for them bunkered command posts of the type described above.

103. Table III summarizes evidence from all sources on hardened facilities for the military and civilian leadership. It will be necessary to obtain additional information to assess the full extent to which this system of leadership protection has been implemented throughout the country.

<sup>24</sup> For details on these statements see Section A of Chapter VI, beginning with paragraph 107.

## VI. PROTECTION OF ESSENTIAL PERSONNEL AND THE GENERAL POPULATION

104. Soviet plans for protection of essential workers and the general population call for dual but complementary measures to:

- evacuate all nonessential population and disperse at least half of the essential personnel prior to attack, to the extent that warning time permits; and
- provide in-place shelters for use in case of surprise attack and for essential personnel who must remain on duty following dispersal and evacuation.

105. These two measures are described clearly in the second edition of the Soviet book *Civil Defense in the Past and Present* published in late 1975:

- "The greatest effect in protection of the populace is achieved by combining methods of shelter with dispersal and evacuation of people to safe areas of the suburban zone. This is why it is extremely important that dispersal and evacuation, as an important component in the complex of missions for protection of the populace, are opportunely planned and carried out efficiently, in compressed periods of time, and to previously prepared areas."
- "The plans provide that workers and employees of major cities and important national economic installations who continue to work in wartime as the basic productive force are to be sheltered in refuges which protect them against *all* destructive effects of nuclear weapons."

106. The extensive information available regarding Soviet objectives for protection of essential workers and the general population is not matched by in-depth evidence of Soviet progress in carrying out these objectives. We have reports of numerous shelters in cities and at industries, but we have not established whether such shelters exist at all cities and essential industries nationwide. Neither do we have evidence of Soviet assessments of the physical vulnerability of the structures we have identified or the total numbers of people afforded such protection. We have the results from US testing of expedient shelters planned by the Soviets for construction in rural areas. We do not know how many may already exist or whether materials and tools for their construction have been prepositioned in rural evacuation areas. Similarly, we have many details about Soviet dispersal and evacua-

tion procedures, much of which is publicly discussed, but we are uncertain about several aspects of Soviet capabilities to assemble, transport, protect, and support urban populations at evacuation sites according to civil defense plans. Similar questions of effectiveness must also trouble the Soviets.

#### A. Shelters

107. As noted previously, shelter construction in the USSR has undergone several shifts of emphasis. Urban shelters were first constructed during the 1920s and 1930s as part of defenses against air attack. In the mid-1950s, this program was questioned in terms of the protection shelters could afford against nuclear strikes. By the early 1960s, as the Soviets came to appreciate the nature of nuclear war, concern about the effectiveness and cost of an extensive urban shelter program, combined with the belief that adequate time for evacuation would be available prior to an attack, led to a sharp cutback in urban shelter construction.

108. Planning for shelter construction continued, however. Soviet military-engineering designers and related civilian institutes designed and tested several kinds of "detached" shelters and shelters to be "built-in" during new construction. In the late 1960s, according to human source reports, standard specifications were worked out between Civil Defense Headquarters and Gosstroy (the State Committee for Construction) for the inclusion of detached, bunker-type shelters or shelters built into the designs of new construction projects. The specifications stipulated that provisions for shelters against air attack be included in plans for construction of all new housing, plants, factories, storage depots, transportation facilities, government buildings, and schools. The funding for shelter construction was borne by the organization responsible for the project, while final approval of the plans rested with the local civil defense headquarters. By 1971 overall coordination of shelter planning and construction design was reportedly centralized in an Institute for Civil Defense in Moscow.

109. Evidence from intelligence sources indicating a gradual shift at the end of the 1960s toward greater reliance on shelters for protection of the population was consistent with pronouncements of civil defense leaders. Altunin expressed the need for "a system for providing the civilian population with protective structures" taking into account the character and features of modern war and the country's economic capabilities. He has also proposed continued studies

aimed at improving the reliability of protective structures.

#### Types of Shelters

110. All shelters with a high degree of protection against blast and thermal effects of nuclear weapons usually have good protection against fallout. All shelters with good protection against fallout, such as the basement of a residential structure, would have some protection against blast and thermal effects, but the protection may be minimal. Categorization of shelters into "blast" and "fallout" refers to the *primary* protection intended to be afforded by the structure. The present emphasis in the Soviet civil defense program is for shelters in urban-industrial areas designed to protect against both blast and fallout. US studies have shown, however, that the number of survivors in an urban area attacked with nuclear weapons would increase significantly even if the population only took advantage of the protection afforded by residential and industrial structures not built especially for civil defense purposes.<sup>25</sup>

111. In this memorandum we have categorized Soviet civil defense shelters as follows:

- *Bunker-type*—underground facilities built as shelters for civil defense purposes having the highest degree of protection against blast effects as well as fallout. These are structures of the type usually provided to protect the leadership and essential workers, but some are also available for the general population. "Detached shelters" are bunker-type structures physically separated from residential or industrial buildings.
- *Dual purpose*—underground shelters which have functional utility in peacetime, but which were designed to be converted quickly for civil defense use. They provide varying degrees of protection against blast and fallout. (See Figure 11.)
- *Built-in*—shelters which afford protection against blast and fallout and which were part of the original design of a residential structure or an industrial facility. At industrial installations, "built-in" as well as "detached" bunker-type shelters may be "dual purpose" structures for economic as well as civil defense use.

<sup>25</sup> *Attack Environment Manual*, Chapter II, "What the Planner Needs to Know About Blast and Shock," Defense Civil Preparedness Agency, June 1973.

Figure 11. Diagram of Soviet Dual-Purpose Shelter

This design from a Soviet engineering handbook is for an auxiliary shop at an industrial facility; in wartime it would serve as a shelter for 900 persons.

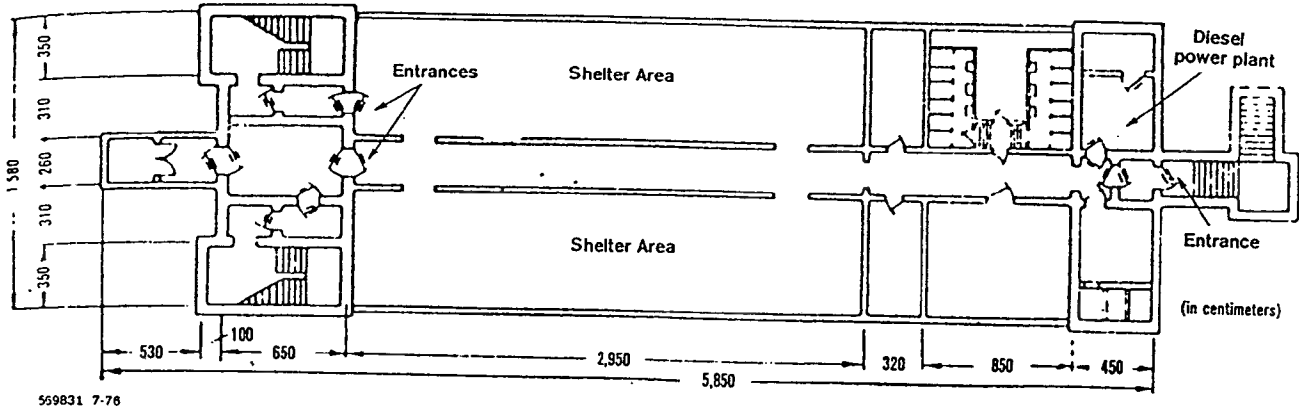


Figure 12. Sketch of Basement Shelter From Soviet Publication

Shown here is an example of converting an existing basement into a civil defense shelter, using sand, dirt, timbers, and other readily available materials.

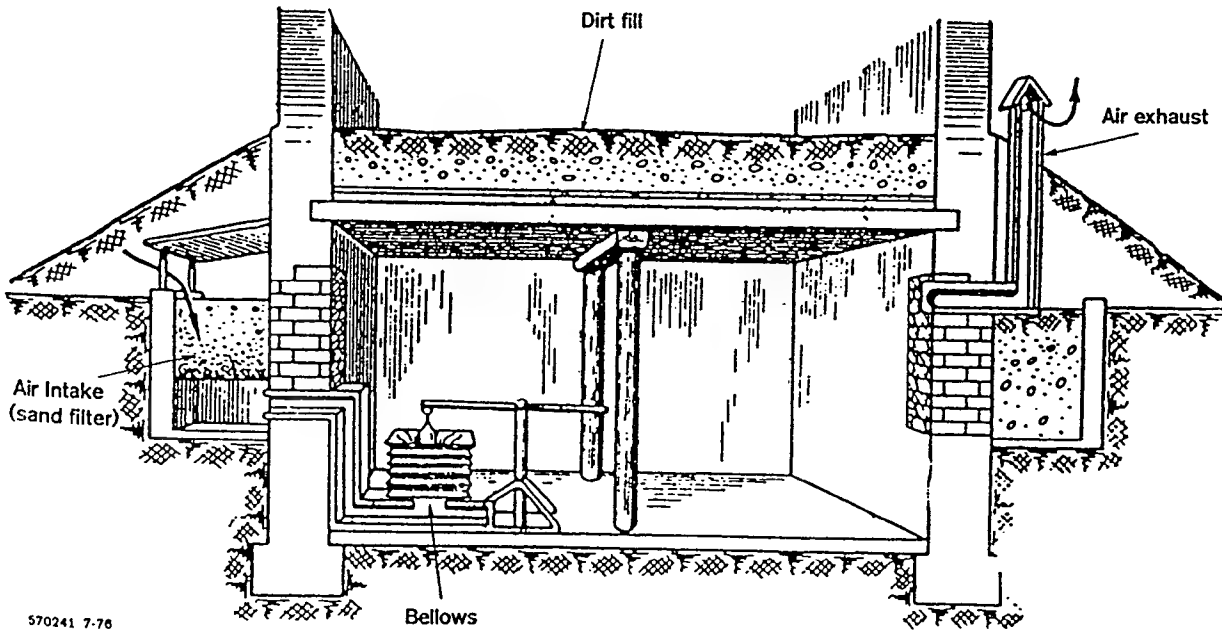


Figure 13. Station in Kharkov Subway

The underground portions of Soviet subways afford protection against fallout and varying degrees of blast.



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- *Basement*—shelters created by adapting the basement areas of residential, government, and industrial structures, primarily for protection against fallout. (See Figure 12.)
- *Subways*—shelters provided by using the subway tunnels in major Soviet cities. The degree of protection against blast varies within subways, but all afford good protection against fallout. (See Figure 13.)
- *Expedient or hasty*—shelters built with materials readily available during the period immediately prior to a nuclear attack. (See Figure 14.)

112. These several types of Soviet shelters offer varying degrees of protection against blast and fallout. According to Soviet planning, the type of shelter, its location, and the protection afforded are functions of the priority assigned to the survival of the protected

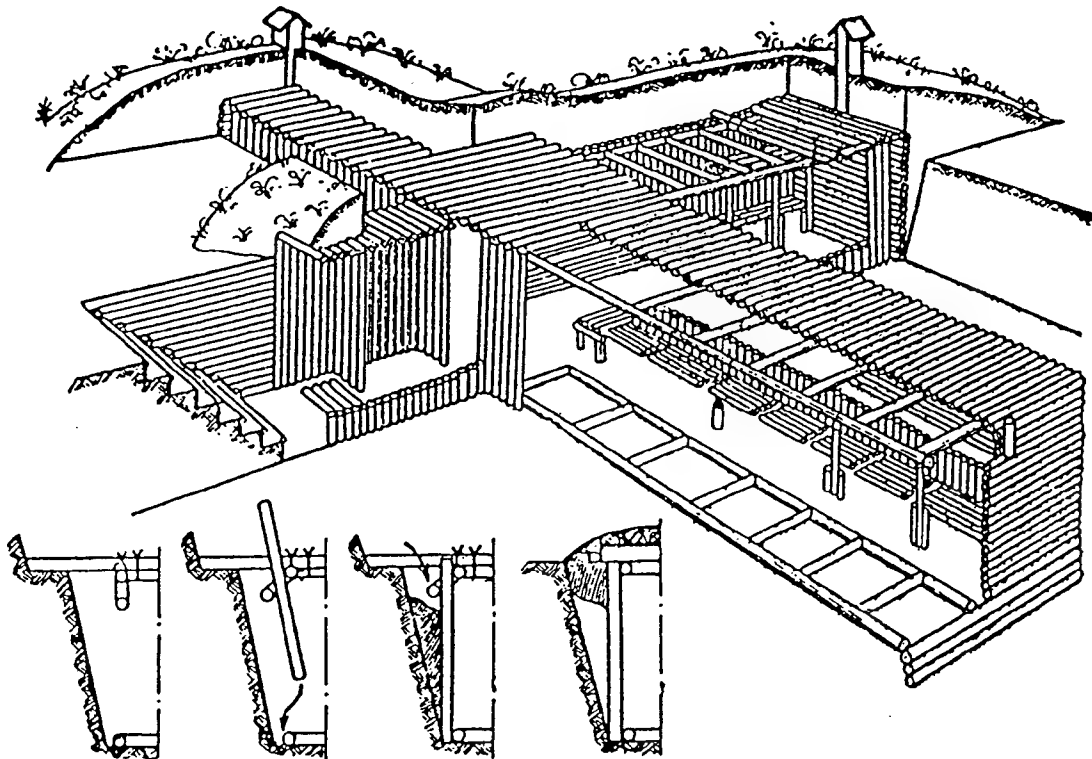
personnel, the likelihood of direct attack or proximity to a target, and the availability of suitable structures that could be adapted as shelters.

113. Detached, bunker-type shelters, adaptable and built-in basement shelters, and subways are available for the protection of both essential workers and the general population. Dual-purpose shelters are also used as underground garages, clubs, and theaters which could be converted quickly to civil defense use.

114. Soviet writings and human sources have also referred to the use of various types of expedient, or temporary, shelters for protection from fallout. They consist of trenches lined with readily available materials and covered with earth. These shelters, which are described in more detail in paragraphs 139-141, are intended primarily for use by the rural population and by the urban population at dispersal and evacuation sites in rural areas. They could also be

Figure 14. Illustration of Soviet Expedient or Hasty Shelter

Diagrams such as this are provided in manuals widely distributed to the Soviet population for use in constructing hasty shelters in dispersal and evacuation areas.



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used to protect personnel in small cities and at factories producing goods which are assigned low-priority. [

### *Shelters in Urban Areas*

115. We are not able to estimate the percentage of the people in urban areas that could be sheltered within cities, or the degree of protection against blast and fallout they would be afforded.<sup>26</sup> The evidence suggests that the hardened shelter construction effort in urban areas is primarily to protect essential personnel. Shelter types identified at industrial facilities and at other urban locations differ in size, structural characteristics, and depth. Human sources have reported that at industrial enterprises a typical detached, bunker-type shelter will hold 150 to 250 people and that built-in shelters will hold up to 900 people. They report that for the general population, built-in shelters can range in capacity from 100 to 500 people, while detached, bunker-type shelters are usually larger. These reports are consistent with specifications for such shelters contained in Soviet civil defense publications. Provision of food, water, medical supplies, power, and life-support systems reportedly varies widely, presumably reflecting the expected contributions of the shelter occupants to the a war effort.

### *Blast Shelters*

116. The hardness values for shelters which we have identified in urban-industrial areas and the degree of protection they would provide against nuclear weapons effects would depend on their distance from ground zero and on weapon yield. [

<sup>26</sup> The Soviet definition of urban areas includes all cities, towns, and settlements established as such as by the laws of the 15 republics. Population minimums may be as low as 500, provided that at least 60 percent of the residents are employed in nonagricultural occupations. Under these criteria, based on the 1970 census and updated for the current year, the Soviet urban population would be about 153 million, or about 60 percent of the total population of 256 million. In this memorandum, reference is made to a hypothetical unrestrained US attack on Soviet urban areas. [

[ ] The term "urban areas" as used in this memorandum includes all cities having a population in excess of 50,000, or a total of about 100 million people. It includes residential and industrial areas as well as other nonindustrial areas of intensive activity such as academic institutes.

117. We are not able to estimate the total number of hardened shelters in urban-industrial areas in the USSR. [

[ ] Considering that industrial facilities in the USSR countrywide number in the tens of thousands, our statistical sample is small for confirming trends, yet emphasis on shelters in industrial areas as reflected in the sample is consistent with Soviet policy pronouncements. More research will be needed, however, for a complete understanding of the overall shelter program and its pace and priorities.

### *Subway Shelters*

118. The Soviets also intend to use subway systems to provide protection for part of the population of large urban-industrial centers. All subways have reportedly been adapted to serve as shelters, and those in Moscow, Leningrad, Kiev, and Baku have heavy doors at the entrances to protect against blast and initial radiation. Those in Moscow, Leningrad, and Kiev also reportedly have retractable steel walls for compartmenting the tunnels and have emergency power sources, food, and medical supplies. As of 1975, there were some 275 km (171 mi) of operating subway tunnels in urban areas that could provide good shelter for large numbers of people.

### *Fallout Shelters*

119. Adaptable basement shelters in urban housing units represent the chief form of protection of the population against radioactive fallout. Since 1970, construction of basement shelters in urban areas has been widely reported by former residents, including some who were employed at design institutes or construction trusts. Even those basements built without any special civil defense features are reported to

include an emergency exit tunnel 15 to 20 m (50 to 65 ft) long. Still we lack a clear picture of the pace and extent of this effort and of the effectiveness of these shelters.

120. Plans for basement-type shelters in newly constructed apartment buildings reportedly include measures designed to offer effective protection against fallout radiation, such as a 1 m (3 ft) thick layer of soil between the reinforced-concrete ceiling of the shelter and the first floor of the apartment building. This would protect occupants in most locations until outside radiation decays to safe levels. Fallout intensity would vary, of course, depending on location, and prolonged occupancy of basement shelters would require prestockage of supplies.

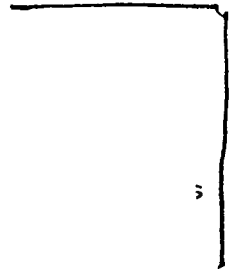
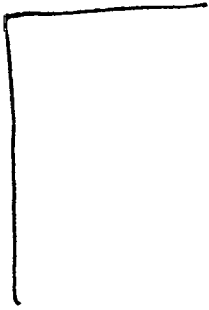
#### *Shelters in Rural Areas*

121. We have little evidence of shelter preparations for the rural population. Because these areas are considered less likely to be attacked, Soviet civil defense writers have proposed a number of makeshift arrangements, using locally available materials and facilities. In the area of Ordzhonikidze, RSFSR, for example, an abandoned mine shaft has reportedly

been converted into a well-equipped shelter. In the rural areas around Minsk, civil defense personnel have recommended that underground feed-grain silos in the collective farms be used as shelters. Protection in rural areas would be provided by expedient, hastily constructed shelters, which are discussed in the next section in more detail (see paragraphs 139-141). United States studies suggest that, depending on their design, the expedient shelters could provide protection against fallout and overpressures ranging from 15 to 200 kPa (2 to 30 psi).

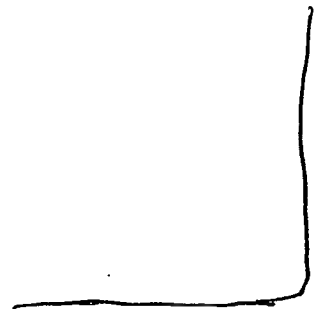
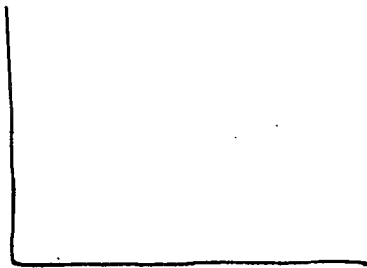
122. Our overall conclusion about the accomplishments of the Soviet shelter program, although admittedly our evidence is incomplete, is that progress in various urban-industrial areas is uneven. This might be expected in a program which depends heavily on local initiatives guided by policy decisions from Moscow which probably involve bureaucratic competition about the essentiality of industries and availability of resources. We are unable in any case, to extrapolate the information we have to draw confident conclusions about the Soviet shelter program nationwide. The evidence does indicate that Soviet priority for shelters is not to save the maximum

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number of urban residents, but to assure that essential personnel survive.

### B. Dispersal and Evacuation

123. Preattack dispersal of essential personnel and evacuation of nonessential population are still key elements of Soviet civil defense concepts. Dispersal and evacuation are treated in detail in civil defense manuals issued in the USSR for public consumption (see Figure 16), as a means of protecting urban populations by relocating them in areas sufficiently far from cities to reduce markedly the casualties resulting from effects of nuclear detonations. The Soviets contend that such actions, if successful, could "substantially reduce civilian casualties in case of enemy employment of weapons of mass destruction." According to one Soviet manual, evacuation could reduce casualties to "a few percent" of the urban population.

124. Under the dispersal concept, workers of urban industries and services that continue operations are to relocate to relatively safe areas outside cities. These areas should be near transportation to facilitate commuting to and from work in the cities.

125. Under the evacuation concept, nonessential elements of the population are to be evacuated beyond dispersal areas into towns and rural areas up to 300 km (186 mi) from the city. Evacuees would not commute, but would remain in place for the duration of the emergency (Figure 17).

126. In addition to civil defense manuals, evidence about Soviet preparations for dispersal and evacuation comes from a variety of sources. While we are confident in our analysis of Soviet concepts, objectives, and overall planning for dispersal and evacuation, we do not have a good evidential base for assessing the extent of the Soviets' preparations to carry out their plans. We have even less basis for forecasting how effective dispersal and evacuation would be in saving lives and providing for the continuity of essential production and services in the cities following a nuclear attack. We have, however, analyzed the Soviet civil defense organization, its command and control, and the resources likely to be available, in order to determine the feasibility of carrying out dispersal and evacuation.

#### *Evacuation*

127. The Soviets stress the importance of advanced preparations for evacuation by civil defense chiefs and their staffs in cities, enterprises, and rural areas.

128. *City Evacuation Committees.* These organizations, composed of representatives of the party, local government, military commissariat, city services, and civil defense chiefs at enterprises, are to prepare detailed arrangements for:

- registering the population,
- determining relocation areas and their capabilities,
- assuring that preparations for the evacuees are made at the relocation sites,
- making transportation arrangements,
- publishing and storing relevant documents, and
- determining evacuation time requirements.

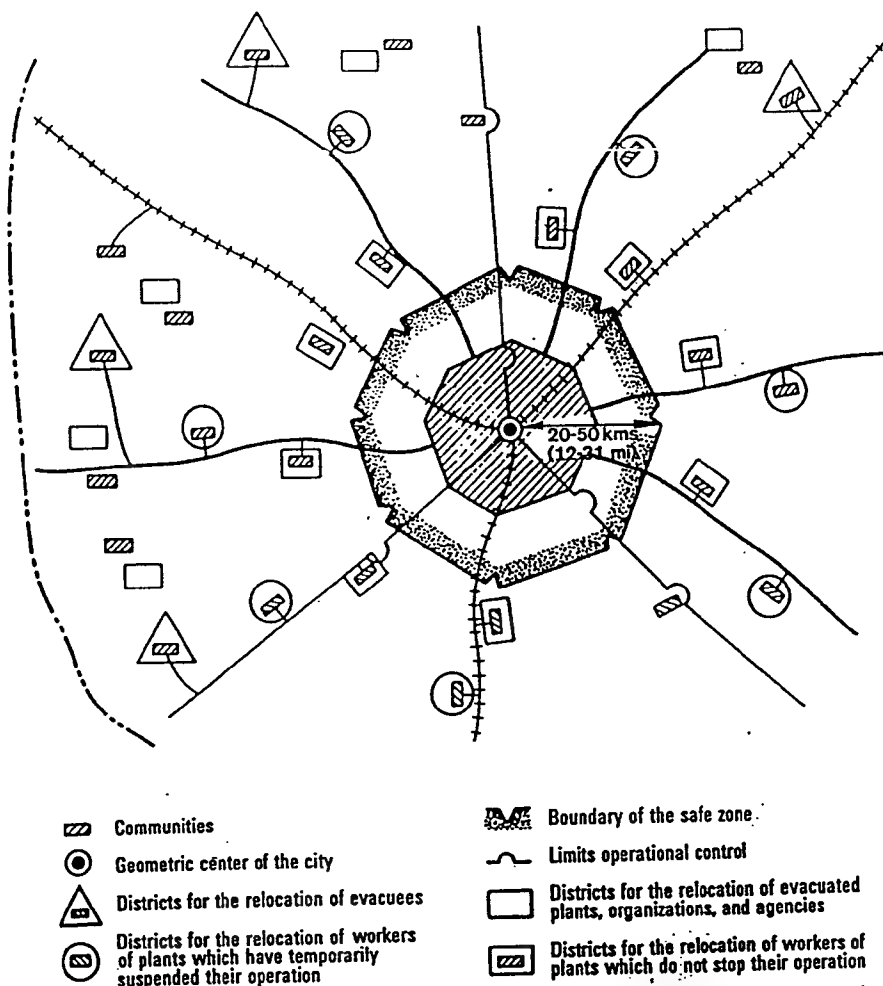
129. *City Civil Defense Chiefs.* The city chiefs of civil defense responsible for establishing assembly and evacuation points within the city (SEPs) where people go to register and prepare for departure. An SEP would be staffed with about 40 to 50 workers and is designed to handle 1,000 to 3,000 evacuees. Evacuees supposedly are notified in advance of the location of their SEPs and other details. SEPs are situated near points for embarkation to dispersal and evacuation sites. An SEP chief maintains a listing of people for whom his SEP is responsible and has information on evacuation routes.

130. *Warning System.* According to Soviet publications and human sources, civil defense authorities would warn the entire urban population by national broadcast, local media, and sirens when rapid evacuation was ordered; less detectable means of notification such as courier would be used if the civil defense preparations were limited in scale or considered sensitive. Upon receiving the warning signal or notification, people would prepare to leave the city, taking along only essentials designated in civil defense literature including personal documents, protective gear, clothing, and food for two or three days.

131. *Transportation.* Soviet civil defense doctrine calls for maximum use of all means of transportation—rail, road, river, sea, air—to relocate people. To avoid conflicts with the movements of the armed forces, control of all the transportation means is a military responsibility. Rail transport is considered the principal means for evacuation. Vehicles also play an important role, with evacuation convoys organized in groups of 20 to 30 vehicles. Services for vehicles, such as repair and fuel supply, would be provided along routes to ensure continuous movement of vehicles and

Figure 16. Soviet Dispersal/Evacuation Diagram

This diagram from a civil defense manual illustrates the Soviet concept for dispersal of workers and evacuation of nonessential urban residents.



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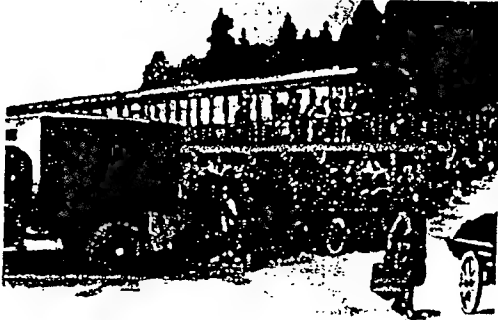
people. Where there is a lack of adequate transport, evacuation would be carried out on foot.

132. *Evacuation Site Selection.* The "outlying zone" to which an urban population is to be relocated is the territory between the outer limit of the potential zone of prompt-casualty-producing effects of a nuclear strike on the city, and the boundary of the next territorial administrative division (oblast or republic). Crossing administrative lines, however, is authorized wherever necessary. Selection of relocation sites within this zone takes into account distance from the city,

access to transportation routes and availability of essential supplies and facilities.

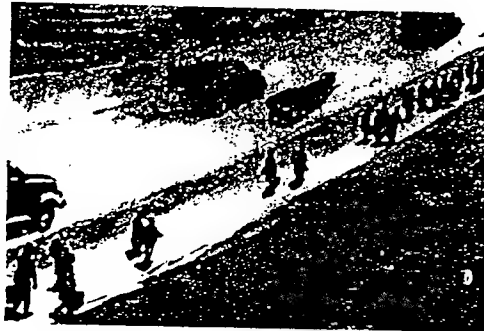
133. *Preparations at Evacuation Areas.* Reception committees made up of rural and city civil defense personnel would operate at receiving points in outlying areas to assist evacuees in reaching final destination points. According to Soviet manuals, evacuees would be housed in public buildings and homes on the optimum basis of one or two evacuees per local resident, or on the basis of two to three square meters (20-30 feet<sup>2</sup>) of floor space per resident

Figure 17. Illustrations of Evacuation, From Soviet Civil Defense Manual



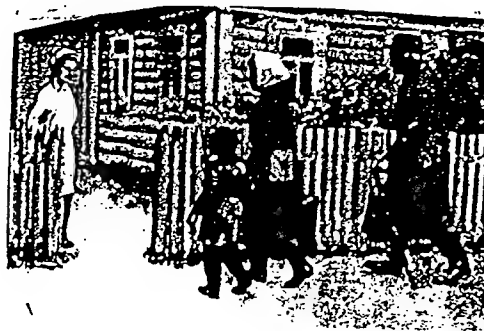
Leaving train upon arrival at the evacuation area.

Moving to final destination points.



Registering with reception committee.

Arriving at evacuation housing.



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or evacuee. In practice, we believe—and emigrés have indicated—that conditions would be much more congested. Details on equipment and supplies for evacuees (including food, water, medicine, and fuel) are discussed later in this chapter.

134. *Time Requirements for Evacuation.* Soviet sources call for evacuation of Soviet cities within the "special period" (a period of warning) preceding an attack, and imply that the evacuation time would be about 72 hours. Soviet authorities have not published their assessment of actual time which would be required for evacuation of the nonessential population. Several US studies have addressed the speed with which the Soviets could complete their evacuation actions. A 1969 RAND study estimated that 100 million urban residents<sup>27</sup> could be evacuated in four days under optimum conditions, using only half of the

<sup>27</sup> This number of urban inhabitants equals the total population of some 450 cities with populations of 50,000 or more and includes almost all major administrative, residential, communication, and transportation centers.

available 1970 transportation capacity. A 1976 Defense Intelligence Agency study of the evacuation of 12 selected Soviet cities concluded that, under the most favorable conditions, the Soviets have a physical capability to evacuate most of the 12 cities within three to four days after movement begins. The major assumptions used in the DIA study were:

- 70 percent of population evacuated, 30 percent dispersed;
- two shifts working in essential industries and services;
- a six-hour alert preceding actual movements (this period of alert has been tested in Soviet exercises); and
- no other complications, such as panic, severe disruption of transport systems, or adverse weather conditions.

Figures 18, 19, and 20 and Table V summarize the findings of the DIA dispersal and evacuation study.

TABLE V  
DIA-Estimated Time Required for Evacuation  
of Twelve Selected Soviet Cities

City	Numbers evacuated (thousands) <sup>1</sup>	Maximum distance (km)	(nm)	Estimated time required after movement begins (hours) <sup>2</sup>	Modes of transport
Leningrad .....	2,673		<sup>3</sup>	117+	mostly rail, some maritime
Kiev .....	1,407	110	60	36	rail and highway
Tashkent .....	1,158	260	140	81	rail
Cor'kiy .....	914	315	170	75	rail and highway
Odessa .....	718		<sup>4</sup>	58	mostly rail, some maritime
Dnepropetrovsk .....	684	185	100	57	rail
Khabarovsk .....	351	410 <sup>5</sup>	220 <sup>5</sup>	56	rail
Orenburg .....	288	185	100	47	rail
Kishinev .....	331	75	40	39	rail and highway
Sevastopol' .....	187	165	90	29	highway
Angarsk .....	164	410 <sup>5</sup>	220 <sup>5</sup>	42	rail
Kirovabad .....	141	95	50	25	rail

<sup>1</sup> Represents 70 percent of city's inhabitants.

<sup>2</sup> Movement begins six hours after the alert. Methodology utilized in calculating evacuation times considers variables such as running speeds, loading and unloading rates, and sequences of unloading dictated by availability of facilities. Since these variables are not known quantities but judgments based on available evidence, the resulting figures for total evacuation time are approximate rather than exact values.

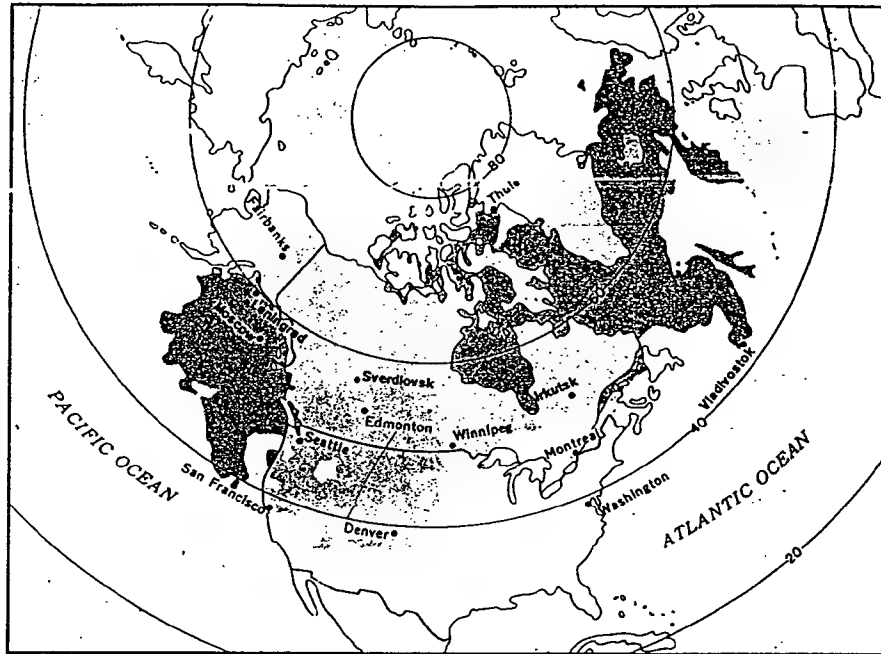
<sup>3</sup> Leningrad can accommodate some 90 large oceangoing ships which could offload evacuees at various ports along the Baltic coast, but a cycle time of three to four days is estimated before ships can return for more evacuees.

<sup>4</sup> Odessa, which can handle some 38 oceangoing ships, could offload evacuees in Romania and Bulgaria, but the cycle time for return of ships is four or more days.

<sup>5</sup> Distances for Khabarovsk and Angarsk are greater than for larger cities because of low population density in surrounding areas.

Figure 18. US and USSR: Comparative Area and Latitude

The USSR has more area than the US for dispersal and evacuation purposes, but displaced personnel would encounter abrupt and severe weather changes characteristic of far northern latitudes.



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135. Significant delays could result from complications in carrying out the evacuation, some of which are almost certain to occur:

- transportation needed for evacuation could be taken for military use during emergencies;
- highways which have low traffic capacity could become congested; and
- shortages of transport equipment and spare parts could occur.

136. Under optimum conditions, according to US studies, evacuation of Soviet cities within three to four days would be feasible. This period does not include the time required for erecting expedient fallout shelters needed to protect evacuees at relocation sites. Allowing at least two days for completion of all needed shelters, we conclude that evacuation of Soviet cities could be completed, under optimum conditions, within less than a week, assuming no effort was made to conceal the operation. The actual time for evacuation would vary from city to city, depending on factors such as the size of the city and distance to

established relocation areas, which may be several hundred kilometers away. To speed up the evacuation process and alleviate shortages of transportation equipment, the Soviets also call for movement on foot of younger and stronger individuals in columns of 500 to 1,000 persons to a distance of at least 25 km (15 mi).

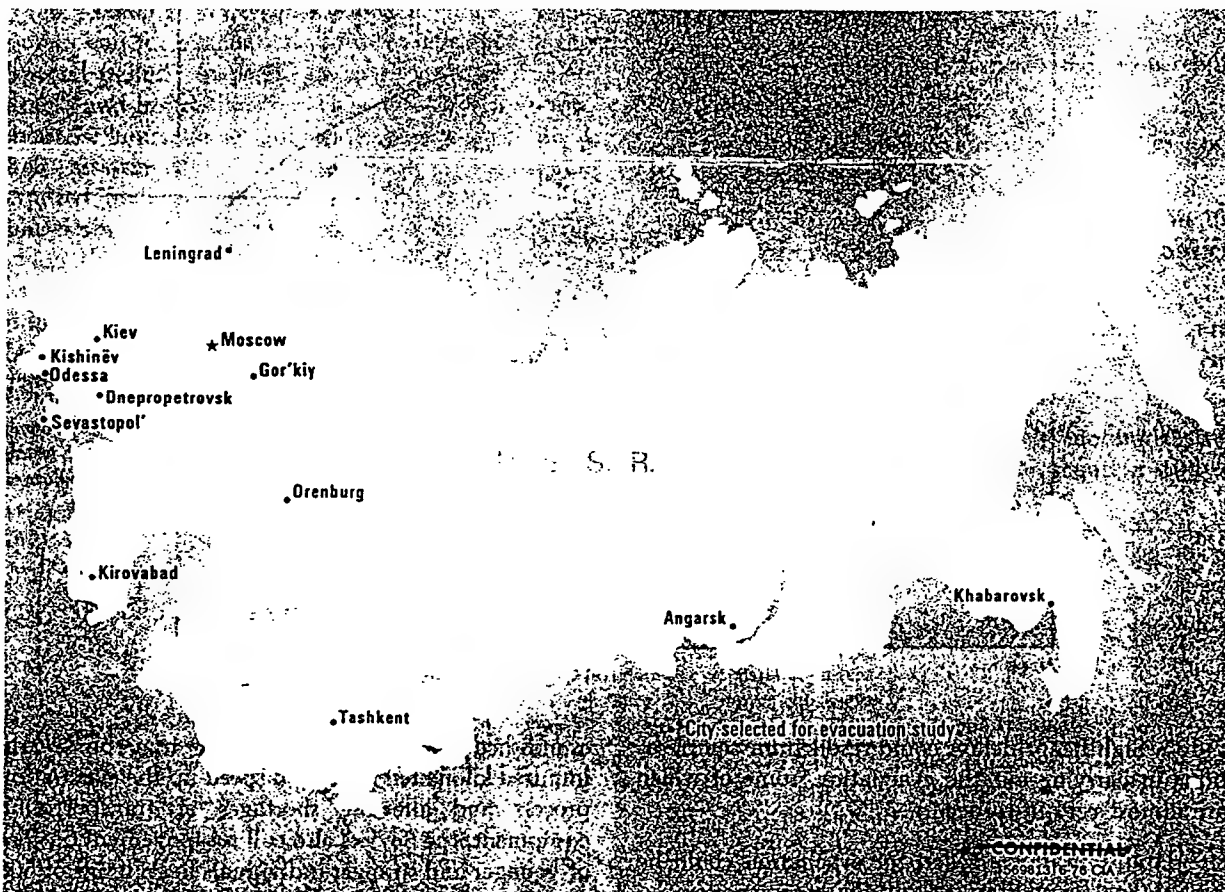
137. It is difficult to estimate with confidence the effectiveness of Soviet evacuation procedures in an emergency. Making these procedures effective requires organization, preplanning, exercises by civil defense units, and a population familiar with civil defense plans and techniques. We are not sure what percentage of the urban population would be evacuated. As the number of urban shelters for the general population increases, and as more of the able-bodied population is assigned to active civil defense work or essential production and services, the size and character of the evacuation program will change. Assuming the evacuees would consist of only nonessential personnel, the size and complexity of the evacuation effort would be reduced and the prospects for its success increased.



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Figure 19. Soviet Cities Used as Basis for Defense Intelligence Agency Study of Soviet Evacuation and Dispersal

To determine time requirements for evacuation, the study used a sample of 12 cities selected from among the more than 250 Soviet cities with a population of 100,000 or more.



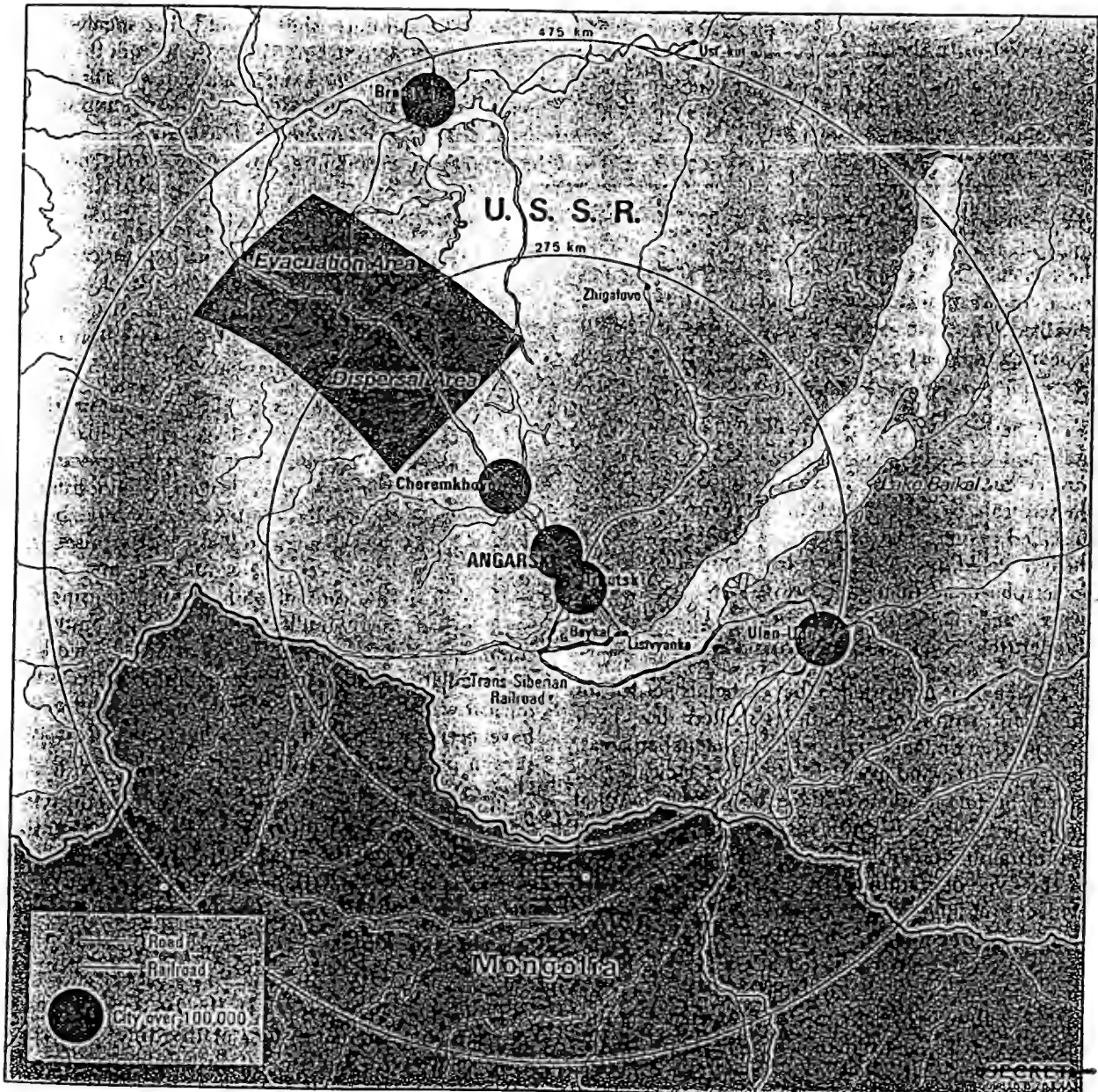
138. *Survival at Evacuee Relocation Sites.* Evacuees are to be housed with rural inhabitants and, with them, seek protection from fallout, primarily in hastily prepared shelters. In shelters they would be protected from exposure to weather and nuclear effects. For at least two or three days, according to Soviet planning, they should manage to survive on the food and personal supplies and equipment each person is required to bring with him. Food, water, and supplies required for longer periods would come from prestored stocks at evacuation sites or stocks already located in rural areas, from food and supplies "in the pipeline," or from reserves. We have some evidence of the amount of farm and off-farm storage of food, the amount in "state reserves." There are some indicators

that there are "strategic reserves" of food and essential supplies. Presumably strategic reserves are levels below which supplies would not be drawn down during peacetime. We have no evidence, however, that food or other supplies have actually been stocked at evacuation sites for use by the urban population. Nor are we aware of Soviet plans for the distribution of essential goods following a nuclear attack.

139. *Expedient Fallout Shelters.* The Soviets have devoted much attention to design and construction of fallout shelters for hasty construction in areas outside cities, beyond range of the initial casualty-producing effects from nuclear attacks on cities. For example, a 1972 Ministry of Defense publication entitled *Anti-radiation Shelters in Rural Areas* emphasized expedient

Figure 20. Angarsk Evacuation and Dispersal Areas Selected by DIA Using Soviet Criteria

The Soviet civil defense criteria used by the Defense Intelligence Agency for selection of the evacuation and dispersal areas shown here included transportation capabilities, locations of likely targets, and probable fallout patterns.



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types of shelters,<sup>28</sup> giving detailed instructions and drawings for the construction of several types:

- covered trench shelter,
- peak-roofed dugout,
- lean-to dugout,
- wood-earth shelter,
- shelter roofed with a reinforced concrete slab,
- shelter made of fascines, and
- shelter of adobe brick.

These hasty fallout shelters may be built from all kinds of available materials such as timber, boards, sheet metal, bricks, and cinder blocks. Straightforward, practical instructions permit construction by unskilled labor. An example of the types of shelter appearing in Soviet publications was shown in Figure 14.

140. Several types of expedient shelters have been built and tested by the Oak Ridge National Laboratory (Figure 21). These tests confirmed that Soviet shelters can be constructed in 48 hours or less by unskilled persons. The testing also proved that these shelters could provide the protection called for in Soviet plans and that, with provision for ventilation, water, and light, occupants could inhabit them through the required shelter period.

141. There is no evidence that materials needed for the construction of expedient shelters has been stockpiled in designated dispersal or evacuation areas. Soviet writings, and a variety of sources indicate that expedient fallout shelters have been built in rural areas during exercises and as part of the summer youth-training programs. We do not know the extent of this type of training, but believe we would have evidence of any widespread program of expedient shelter construction, or prepositioning of construction materials. The tests conducted at Oak Ridge showed that practice, even by unskilled people, was not necessary to construct the expedient shelters described in Soviet civil defense manuals. Shelter effectiveness also has been tested by the Defense Nuclear Agency and was found to be surprisingly high, in one case theoretically enabling survival of occupants in a shelter located only one mile from a one-megaton nuclear explosion.

<sup>28</sup> An English translation has been prepared by the Oak Ridge National Laboratory (ORNL—TR—2745).

### *Dispersal*

142. Civil defense plans call for each essential industrial plant or public facility such as transport to continue operations, dividing its personnel into two 12-hour shifts. The work shift remaining in the city would be protected by blast shelters in case of an attack. The off-duty shift would be located in dispersal areas 60 to 80 km (37 to 50 mi) from the city, but no more than 120 km (75 mi) away. Dispersal areas would be located so that round-trip commuting time of the workers would not exceed four to five hours. Workers commuting by train should not be farther than 5 km (3 mi) from a railroad station.

143. Procedures for dispersal essentially parallel those for evacuation. Detailed instructions for carrying out dispersal plans are contained in handbooks and in instructions tailored to specific installations, which frequently are considered classified information until the dispersal plans are implemented.

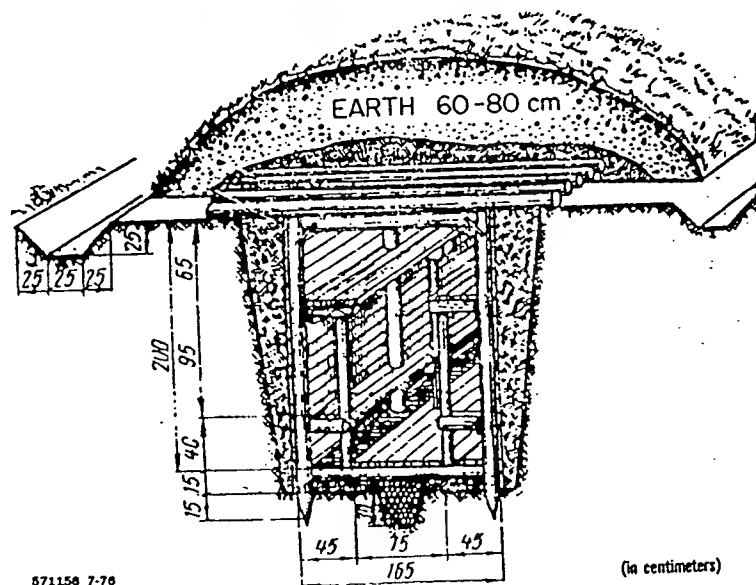
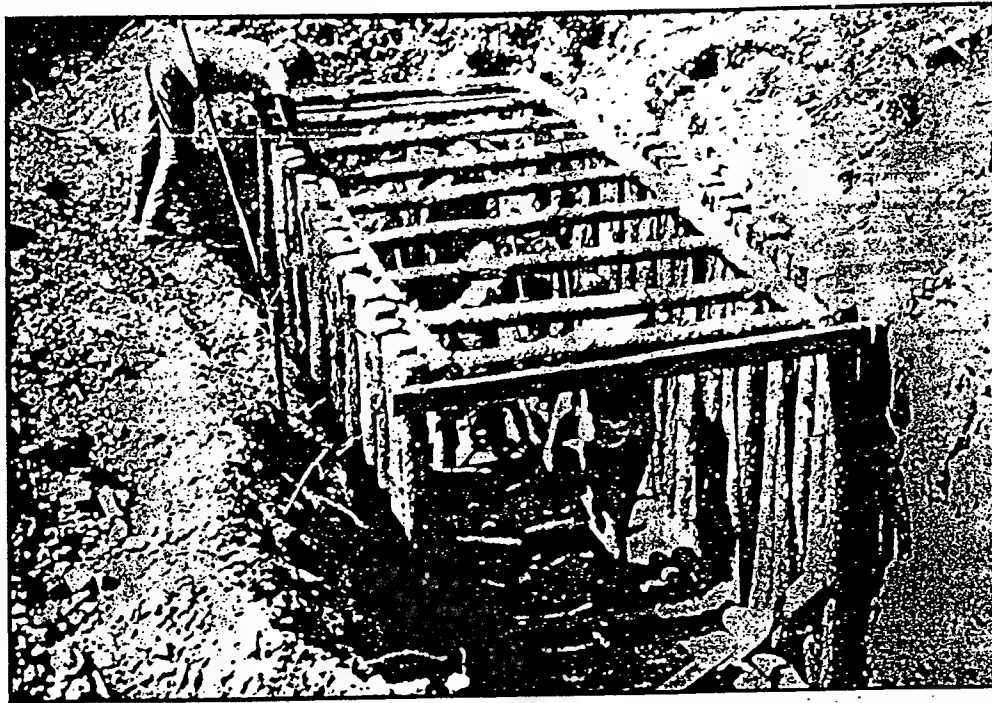
144. At dispersal sites, it is planned that workers and families would build expedient shelters, like those at evacuation sites as described in the previous section. However, according to open literature and human sources, permanent-type dispersal sites are being prepared, using facilities controlled by enterprises and installations such as rest areas and summer youth camps. These sites contain aboveground housing for workers and their families, shelters, and bunkered command posts from which the civil defense work at the installation in the nearby city would be directed in nuclear war. We do not know how many of these sites have been prepared; [ ] [ ]

145. According to a variety of sources, the civil defense leadership, industrial workers and essential municipal and other institutional personnel are trained, organized, and equipped to carry out rapid dispersal. We have reports of actual dispersal exercises which have included practice in preparation of relocation sites for occupancy.

146. *Time Requirements.* In the 1970 civil defense manual, there are indications of the time envisioned by the Soviets for carrying out dispersal operations. In the section dealing with action in an industrial plant in response to a "threatening situation" alert (i.e., strategic warning of nuclear attack), the manual lists various time schedules for implementing measures related to dispersal. A 72-hour period is specified for dispersal of workers, office staff, and their families using available transportation facilities. The Soviets

Figure 21. US Testing of Soviet-Designed Shelter

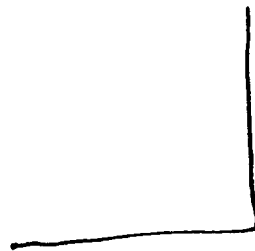
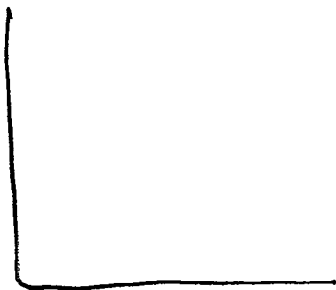
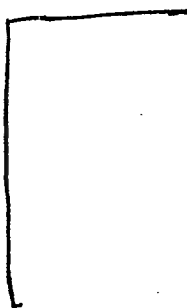
Sponsored by the Oak Ridge National Laboratory, untrained US citizens constructed and lived in Soviet-designed hasty shelters such as that in the photograph. Normally, as part of the testing, a family averaging six persons built and occupied a shelter within 36 hours to receive a cash bonus. They followed plans from a Soviet civil defense handbook, such as the sketch shown.



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recognize that some workers may walk to dispersal areas. Total time for dispersal should be considerably shorter than that for evacuation, since dispersal would involve the movement of fewer people over shorter distances.

147. The diagram from the 1969 civil defense manual, shown previously in Figure 16, illustrates how workers of plants continuing operations are relocated closer to the city than all other relocated individuals. Factory cadres during exercises may have already built bunkers and related facilities at some of the dispersal areas for use as alternate command posts, however, neither the Soviet writings nor human sources have provided precise details on this subject. It is assumed that alternate command posts for directing essential economic activities would be at dispersal points (see Chapter V).

148. We conclude that the personnel of Soviet economic installations are better organized and prepared to carry out civil defense plans than the general population. Dispersal of essential workers would be easier than evacuating the remainder of the urban population because:

- Workers and their families are a close-knit community concentrated around factories.
- Factories have their own transport facilities which would facilitate the movement of people.
- Dispersal locations are relatively close to the city, and this would decrease the time needed to reach the site.
- Exercise activity at factories is well organized and includes practicing procedures for dispersal to relocation sites.

149. Soviet plans and programs for relocating industry and for other measures to provide for the continuity of production are discussed in Chapter VII.

#### *Dispersal and Evacuation Exercises*

150. Evacuation and dispersal exercises for the civil defense leadership and cadres are emphasized by Soviet authorities as the means of increasing readiness for highly organized and tightly controlled movement from cities. There is evidence that some economic installations and government services that will continue operations in the event of war have conducted detailed exercises, but we do not know whether such exercises are frequent or widespread. Also, we are uncertain whether some exercises were simulations or whether there was actual ground play. Evacuation

exercises for the general population have also been conducted, but in those where there was actual ground play the public showed little enthusiasm.

151. Soviet civil defense manuals offer detailed suggestions on how to conduct exercises. They require many hours of planning, detailing all the actions required down to the lowest organizational levels. Dispersal and evacuation exercises include the following main elements:

- establishing evacuation and assembly points,
- determining modes of transport,
- selecting relocation sites,
- reception and quartering of evacuees,
- providing for the commuting of work shifts,
- maintaining shelters at places of work, and
- constructing shelters in dispersal and evacuation areas.

152. Information available on exercises involving actual dispersal and evacuation exercises through human sources and the Soviet press is limited. We doubt that any actual city-wide evacuation exercises have been undertaken, but exercises involving entire villages, portions of towns, or industrial plants have been reported. We do not expect the Soviets to conduct exercises involving the actual, large-scale evacuation of cities in view of the costs of such exercises, the disruption of production, and the possible misunderstanding abroad of their purpose.

153. Factory dispersal appears to be the most frequent type of exercise, and usually includes elements of the work shift not on duty, since management is not inclined to disrupt production. Representative industrial exercises include:

- a dispersal test involving 800 persons at the Khar'kov Tractor Plant in Moscow;
- evacuation of a Moscow plant's civil defense rescue units, which then simulated rescue operations at the plant;
- removal of 300 persons by trucks and railroad cars in Dnepropetrovsk at the Ukrainian State Institute for Design of Metallurgical Plants;
- use of vehicles to remove workers from an electric power plant in Kiev (this exercise included rerouting of convoys because portions of the assigned routes were assumed to have been washed out).

154. Evacuation exercises of nonessential elements of the population are mentioned less frequently, but several instances have been reported:

- At Aktyubinsk (population 150,000) trucks reportedly transported people to relocation sites outside the city; however, probably less than 5 percent of the urban inhabitants was involved.
- In Tiraspol (population 126,000) at least half of the housewives ignored an evacuation exercise alert, which was terminated in less than four hours for lack of participation.
- An exercise held at Moscow University is reported to have involved 3,000 persons. Both railroad and motor vehicles were used to transport the evacuees, who were then quartered with local residents at their assigned relocation area.

155. In addition to exercises, according to open sources, transportation facilities are periodically tested for application to civil defense plans. We have noted for example:

- convoy travel for evacuation in Leningrad, Zaporozhye, and Sevastopol',
- streetcars for dispersal of steelworkers and their families in Magnitogorsk,
- ships on the Baltic Sea at Tallinn and on the Black Sea at Sevastopol' and Feodosiya for use in evacuation, and
- adaptation of riverboats to carry sick and wounded at Omsk.

156. The recent shift in policy to concentrate most training effort in cadres and services essential to civil defense operations rather than the general public suggests that the Soviets have concluded that large-scale public participation in civil defense exercises is not required. If so, these conclusions would be consistent with the findings of a 1975 Stanford Research Institute study, "Importance of Preparatory Measures in Disaster Evacuations," prepared for a number of US industrial firms. On the basis of an analysis of disaster evacuations in the United States, SRI concluded that large-scale public participation in evacuation drills was not necessary for disaster planning.<sup>29</sup>

<sup>29</sup> Main elements of the present Soviet civil defense program correspond closely to the SRI findings concerning essential preparations for disaster evacuation: broad vigorous planning; heavy investment in an infrastructure and equipment; orientation and training of local officials and emergency personnel, including tests and exercises; enhancing in normal times the credibility of the source of instructions during an emergency; and deemphasis of public participation in practice drills.

157. The Soviets apparently believe it is essential to test the dispersal capabilities of industrial plants and other essential facilities and services. However, the state of readiness of these organizations to carry out dispersal plans is uneven. This may result from differing priorities assigned to industrial or other facilities for dispersal of the essential workers.

158. The recent emphasis the Soviets have placed on their urban shelter program and on reducing the time for evacuation is due to concerns regarding the overall effectiveness of urban evacuation under circumstances in which nuclear war started with little prior warning. Considering the size, structure, quality of leadership, and level of training of the civil defense organization, the availability of transportation resources, and time required to construct expedient shelters, we believe that under optimum conditions the population of most Soviet cities could be evacuated in less than a week. With additional planning and training and without mass public exercises, this time could probably be reduced. However, considering the variety of circumstances which could affect an actual evacuation, including possible enemy responses, Soviet leaders would have major uncertainties about the prospects for success of an urban evacuation.

### C. Supplies and Equipment

159. To meet their civil defense objectives, the Soviets require large amounts of supplies and equipment to protect personnel and essential materiel from the effects of chemical, biological, and radiological (CBR) weapons, and to sustain the population before, during, and after a nuclear attack. The most critical supplies are food, water, medicines, and fuels. In addition to individual protective equipment, large quantities of equipment are needed for firefighting, decontamination, debris removal, and other measures.

160. We have good evidence about the types of equipment required for Soviet civil defense, and common-use items are being produced in large quantities. We cannot determine, however, the extent to which present stockpiles would satisfy the requirements envisioned by Soviet plans. We are also aware that large amounts of supplies and manufactured goods which would be critical to the continuity of production and to survival of the population following a nuclear attack are in the normal distribution pipeline. Similarly, while we know that the Soviets maintain reserves of food, medical supplies, fuels, and industrial raw materials and equipment, our evidence

on the size of these reserves and the amounts in the pipeline is very limited. In some cases we have been able to estimate pipeline and reserve storage capacities, such as the amount of on-farm and off-farm storage of grain. We are unable to determine precisely what percentage of critical supplies in reserve and in the pipeline are located outside urban areas.

161. We have a general appreciation, however, of the stock levels of essential supplies normally located outside urban centers, and we have made rough calculations of present consumption by the urban population. These calculations suggest that following a nuclear attack on cities which was preceded by a period of warning to make final preparations, supply levels would be sufficient to satisfy the minimum subsistence needs of the population for weeks and perhaps months. Distribution of supplies to the relocated urban population would probably be a more serious problem than stock levels.

#### *Individual Protective Equipment*

162. The basic items of individual protective equipment are masks, respirators, and protective clothing. For years, gas masks of various types have been produced and distributed,<sup>30</sup> and the general population has been instructed in their use. In 1974 the Soviets announced distribution to civil defense units of a new mask which features a closed system which purifies and recycles exhaled air. There is little evidence to indicate that the number of masks available would satisfy total Soviet requirements.<sup>31</sup> Masks are not retained by the general population, but are stored at work or in housing areas for training and for emergencies. Some former residents have reported that masks were on hand for essential personnel at the facilities where they had been employed. Detailed instructions in civil defense manuals on how to fashion expedient masks suggests an inadequate supply of gas masks for rural inhabitants and nonessential urban residents. The most readily available apparatus for protecting the respiratory system is

<sup>30</sup> Three principal gas masks for use by the civilian population are the GP-4U and GP-5 for adults and the DP-6 for children. For children too small to wear even the smallest gas masks, an infant protective chamber is produced. The self-contained gas mask IP-46 is designed for use in rescue work in flooded shelters and cellars, in extinguishing fires, and restoring in utilities in underground installations.

<sup>31</sup> Production of masks and clothing requires little investment in labor and capital equipment, and could be accomplished by any rubber goods manufacturing plant.

a simple inexpensive respirator, which is used on farms in peacetime while fertilizing crops, and is available in large quantities.

163. Special protective clothing—coveralls, head and hand covering, goggles, and boots—is normally available only to civil defense personnel responsible for monitoring, decontamination, rescue and repair, and similar field functions (see Figure 23). While human sources have reported that protective clothing was on hand at industrial facilities for civil defense units, we do not know the quantities of such clothing produced or whether all civil defense units are so equipped. Civil defense training of the general population has included instructions on individual protection by covering the skin with layers of regular clothing, hats, scarves, gloves, and boots or galoshes.

#### *Other Equipment*

164. Civil defense manuals describe the protective equipment required for civil defense operations, including equipment for construction and debris removal, firefighting, decontamination, water purification, and detection of radioactivity and of chemical and bacteriological agents.<sup>32</sup> Our knowledge of production, storage, and distribution varies according to type of equipment and its assignment to civilian or military organizations.<sup>33</sup> In general we have a better understanding of military equipment than we do of that for civilians.

165. Most of the equipment required for civil defense operations is in peacetime use. For example, military units as well as civilian organizations have numerous hand tools of various types and mechanized equipment such as bulldozers, tractors, trucks, and fire

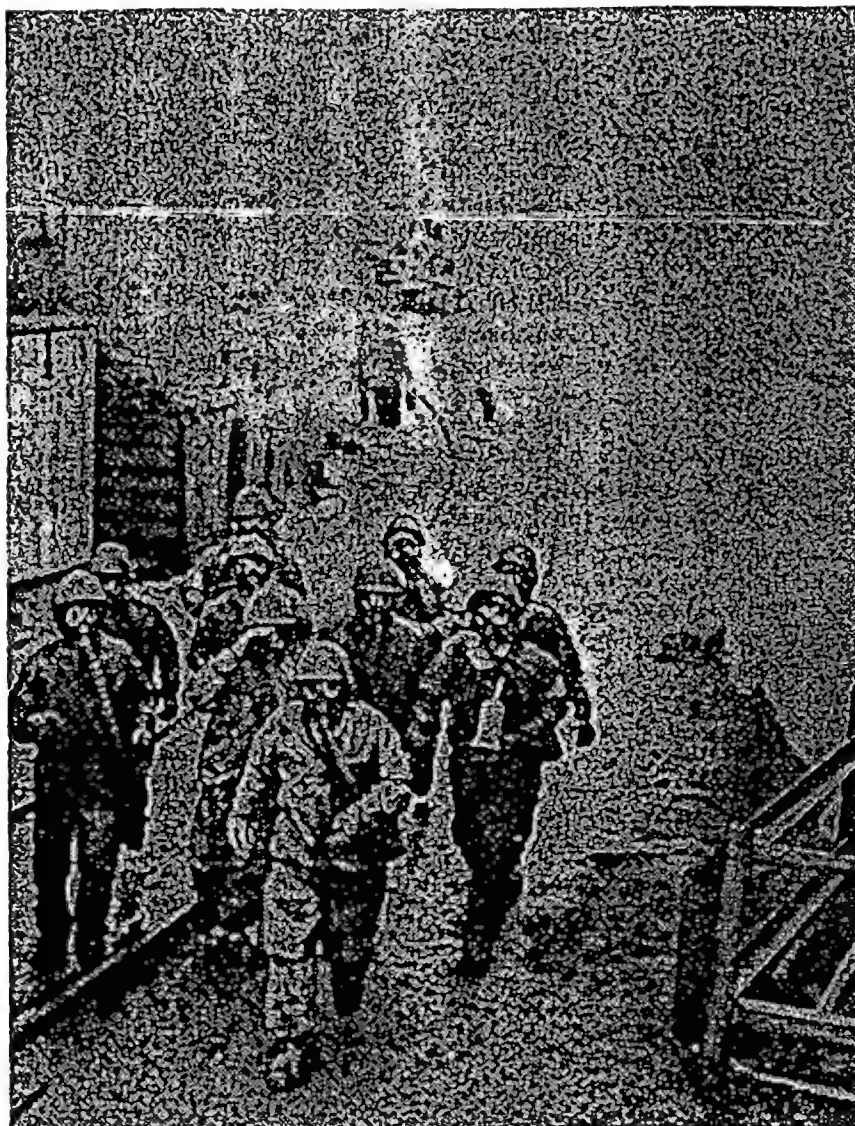
<sup>32</sup> The Soviets have produced several devices for detecting and measuring radiation. Included are the DPO63 radioactivity indicator for detecting contamination of an area; the DP-2 roentgenometer, for measuring radiation levels in a contaminated area; the DP-21 beta-gamma radiometer, for determining the degree of radioactive contamination on surface of various objects; and the DP-5 roentgenometer-radiometer, a universal instrument for detecting and determining the level of gamma radiation. Also several types of dosimeters have been produced to measure general radiation levels and to determine the total dose received by individuals. Both civilian and military radiological monitoring teams use this equipment.

<sup>33</sup> There has been considerable intelligence activity directed toward depots containing military materiel, but little attention has been given to either storage sites for civil defense equipment and supplies or the techniques for maintenance and issuance. Consequently, any estimates concerning these aspects are extremely sketchy.



Figure 23. Soviet Workers in Civil Defense Exercise

These workers, using masks and protective clothing, are participating in a civil defense exercise at an aircraft factory.



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engines. With proper planning, much of this equipment can be removed from target areas, given the time to do so, for shelter building and other tasks in dispersal and evacuation areas and subsequent return for rescue, repair, and restoration work in urban areas. Soviet writings stress civil defense requirements for equipment and vehicles from civilian organization-

ism, but we do not know the relative priorities of civil defense and the needs of tactical military units.<sup>34</sup>

<sup>34</sup> Soviet military forces now have at least ten times more vehicle-mounted decontamination devices than the US military. [almost 5,000 CBR decontamination vehicles at approximately 300 military-associated sites in the Soviet Union. Also it is estimated that at least 5,000 more such vehicles are in the military inventory.]

166. Some Soviet writers have identified the coordination of civil defense and military requirements for civilian equipment as a serious problem. We do know that many motor vehicles assigned to civilian organizations are organized into military reserve units called *avtokolonas*, whose mission is to support movements of military forces. Soviet civil defense literature has alluded to the use of these units for civil defense operations. In addition to vehicles for transport, many industrial plants have heavy construction equipment, and their civil defense cadres are rated as probably the best organized and most effective of all civilian civil defense units.

167. Equipment for civil defense work is available not only in civilian organizations and industries and in civilian and military civil defense units but also in tactical military forces, military commissariats, rear services military logistic bases, internal security forces, construction troops, and paramilitary units. All of the latter have individual protective equipment, vehicles, and communications equipment, together with technicians experienced in their use and servicing. Construction troops and military units, for example, possess the heavy equipment needed for rescue, repair, and reconstruction.

168. We believe much of the equipment assigned to organizations other than regular military units would be available for civil defense operations, as anticipated in Soviet planning. The availability of equipment in rear services military depots and in military combat units would depend on the tactical situation. Military writings suggest, however, that some regular military units, and presumably their equipment, would be involved in civil defense activities under the overall direction of military district commanders. Our knowledge of production of various types of equipment is fragmentary, as is reliable information on storage and distribution.

169. We conclude that regardless of the circumstances of a nuclear attack, sufficient equipment of all types would probably be available for the leadership and to support military forces. We are less confident about the availability of specialized individual and unit civil defense equipment—masks, protective clothing, decontamination equipment to protect key personnel and essential industries. We are very uncertain about how much individual civil defense equipment would be available to the general population. General-purpose equipment in peacetime use—trucks, bulldozers, tools, etc.—would probably be sufficient to support civil defense operations

provided adequate warning were available to make final preparations. An attack without warning, however, would severely degrade Soviet capability to provide such support for the general population.

### Supplies

170. Some appreciation for the magnitude of the supply problem following a large-scale nuclear attack on the Soviet Union is conveyed by distribution of population and land use in the USSR, as illustrated in Figures 24 and 25. The distances between population centers would aggravate the problem of distribution of consumption supplies between regions of the USSR. Moreover, the Soviet road and rail networks are not as highly developed as in Western Europe or the United States, and would be vulnerable to some disruption as a result of a nuclear attack. There is, however, a degree of regional self-sufficiency in consumption goods in the USSR, which would ease somewhat the problem of long-haul transport and distribution of supplies.

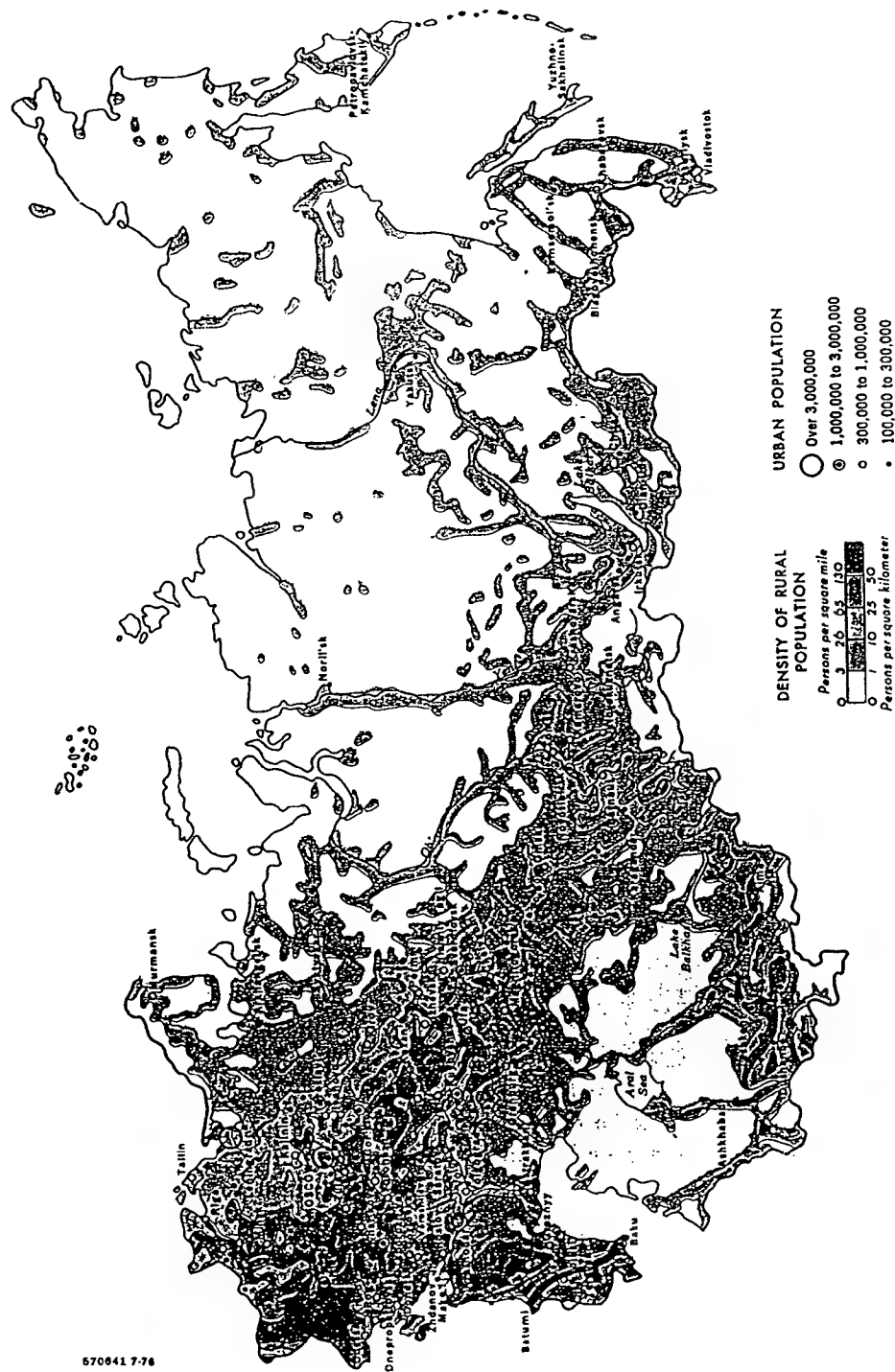
171. Assessments of the adequacy of Soviet planning for supplies and their distribution are very sensitive to assumptions about the period of warning prior to a nuclear attack. They are also sensitive to the overall effects of an attack involving several thousand nuclear weapons on Soviet cities, industries, transportation systems, and the population. Even among US experts there is disagreement about nuclear effects.<sup>35</sup> In view of these uncertainties, neither we nor Soviet planners can do more than calculate the theoretical capacity of the USSR to furnish supplies to the leadership, the industries, and the population in a post-nuclear-attack situation. This is difficult even with complete information on the locations and amount of essential supplies in the pipeline and in reserve, and our information is far from complete. The information we do have suggests that the Soviets have made detailed plans and serious preparations to provide for most critical supplies.

172. In this section of the memorandum we have limited our discussion to the categories of supplies most critical to survival of the population—food, water, medical supplies, and fuels.

173. *Food.* As with other aspects of the USSR's civil defense program, accurate and specific information about Soviet plans concerning food supplies and their distribution is lacking. In the Soviet Union such

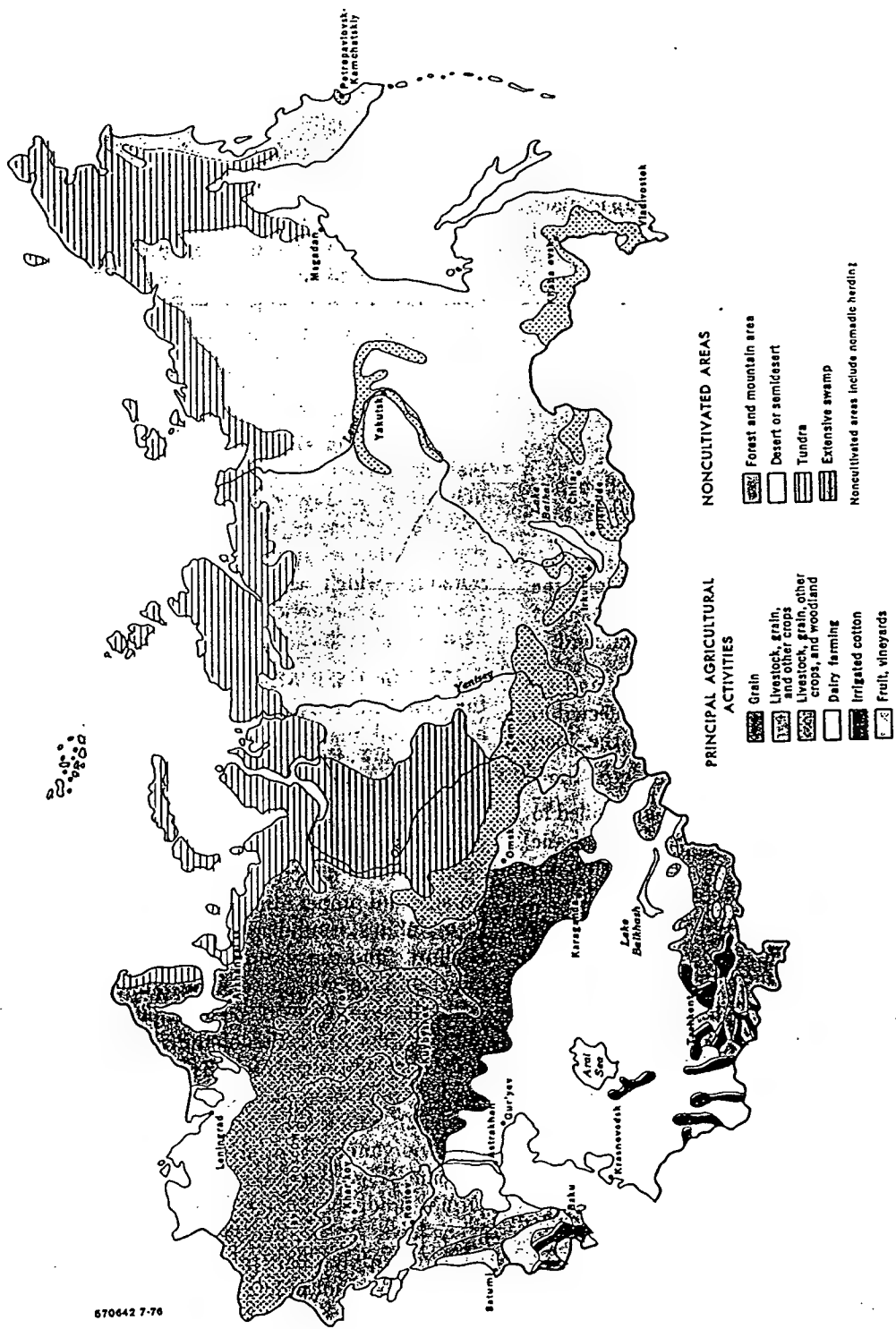
<sup>35</sup> For example, see *Physics Today*, "Civil Defense in Limited War—A Debate," April 1976.

Figure 24. Distribution of Population in the USSR



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Figure 25. Land Use in the USSR



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information falls into the category of state secrets. However, given the centralized nature of the country's economy and society, it is highly probable that the Soviets' civil defense planning for food distribution following a nuclear attack calls for a continuation of the present procurement and marketing system, modified by the civil defense organization to cope with the post-nuclear-attack environment. A food supply system under central supervision, readily adaptable to emergency conditions, is already in place in the USSR. Offsetting this advantage are several deficiencies which would be exacerbated, perhaps in the extreme, depending on the time of year, duration, severity, and scope of a nuclear conflict.

174. The most important ingredients for an assessment of the adequacy of food supplies for the Soviet population following a large-scale nuclear attack are:

- the vulnerability of the food production and distribution system to disruption and the time required for its reconstitution;
- the amount of food available to supply the population during the period of disruption of the production and distribution system; and
- the location of food in the pipeline and in storage relative to areas likely to be subjected to nuclear attack (the survivability of the food supply).

175. The Soviet Union has long strived and failed to produce abundant and reliable supplies of food; basic food requirements are met but there are frequent crop shortfalls. The situation is further complicated by the cumbersome Soviet purchasing and distribution system, which makes these operations awkward and inefficient in the best of times and circumstances, although it would have some advantages over a free market system in the aftermath of a nuclear exchange. Inasmuch as providing for reserve stocks constitutes an added strain on the system, the Soviet authorities presumably hold these reserve food supplies to levels deemed consistent with minimum requirements for contingencies—i.e., crop failures or war.

176. The Soviet population, which currently consumes (on a per capita basis) about three times the minimal daily calorie intake required for subsistence, could adapt to reduced food availabilities with little direct negative impact on the country's military capabilities—although the subsistence level could not be maintained indefinitely without severe consequences

to health and labor productivity. As World War II demonstrated, the Soviet population is able to withstand widespread deprivation of many vital products, including foodstuffs, and still function effectively. Awareness of these factors could prompt Soviet leaders to limit their investment in emergency food storage facilities and other contingency measures for food supplies and distribution as part of the civil defense program.

177. Most agricultural products in the USSR reach the consumer via the state procurement system—the Procurement Ministry and the Central Union of Consumer Corporations (see Figure 26). There also exists a lively and extensive market in "surplus" produce which reaches the consumer through collective farm markets. State purchasing organs have fixed delivery quotas for each product established by Gosplan. Substantial premiums are paid for above-plan production. Almost 100 percent of some products—such as raw cotton, flax fiber, sugar beets, tobacco, tea leaves, and wool—is purchased by the state; substantial portions of others, such as grain and potatoes—which are needed for seed, feed, and personal consumption—are consumed within the agricultural sector.

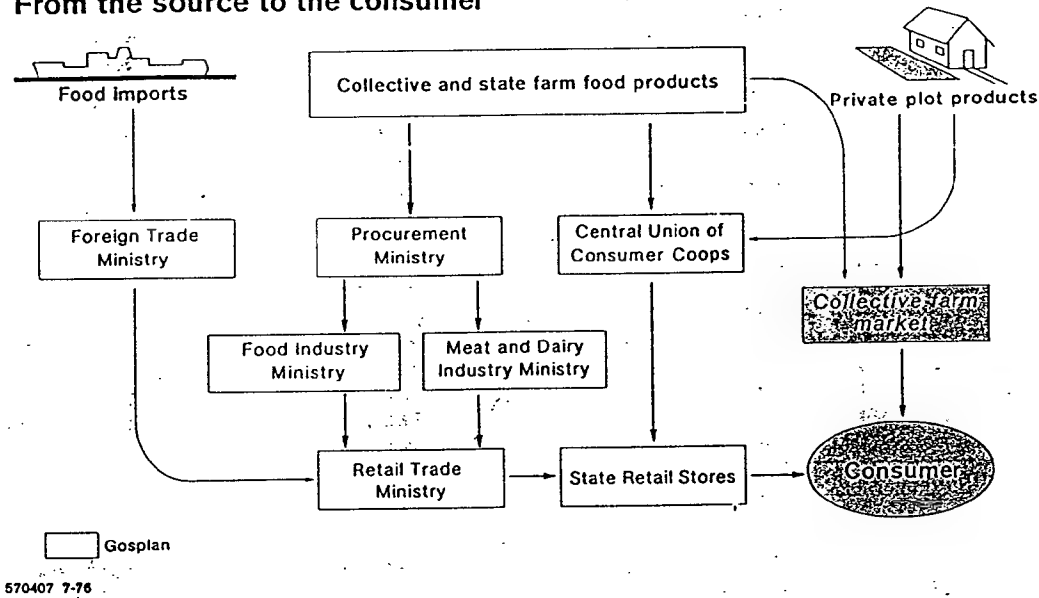
178. The USSR Ministry of Procurement organizes the acquisition by the government of all types of agricultural materials, supervises the fulfillment of procurement plans, and is largely responsible for food inspection. It coordinates the work of other ministries and departments which purchase agricultural products and defines the zones or areas in which they may operate. It is directly responsible for the purchase, storage, and proper utilization of state grain resources. It maintains centralized grain drying and storage facilities (on-farm grain storage is managed by the farm) and operates processing plants such as mixed feed mills and flour mills. Other purchasing organizations are the Ministries of the Food Industry, Meat and Dairy Industry, Light Industry, and Trade and the Central Union of Consumer Cooperatives (Tsentrosoyuz), which buys not only from farms but also from individuals who have surplus output from their personal plots. State and collective farms may market surplus products through markets in cities and nearly every town and village, and are thus an important source of supply—particularly for urban residents who frequently cannot purchase good quality fruit, vegetables, and meat in the state retail trade network.

179. Grain production in the USSR has grown rapidly since 1960, but the overall trend in output is

Figure 26. Food Distribution in the USSR

The Soviet food distribution system is structured around a number of government ministries, with most domestic production channeled through the Procurement Ministry and the Central Union of Consumer Cooperatives.

From the source to the consumer



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obscured by large year-to-year changes. For example, the 1975 crop was about 30 percent less than production in 1974 and less than two-thirds of the record 1973 crop (see Table VI). The USSR has reacted to recent crop shortfalls by importing unprecedented amounts of grain.

180. Growth in demand for grain has outpaced production growth in recent years primarily because of a sharp expansion of its use as livestock feed. Average annual production in 1970-72 was 12 percent greater than in 1967-69, while domestic consumption increased by 18 percent.

181. The USSR produces ample grain to feed its population. Even in years of harvest failure such as 1975, food use requires less than one-half of total production. Industrial requirements claim one to two percent, while seed requirements range from 12 to 26 percent. In contrast to other uses, quantities of grain fed to livestock have been accelerating. About one-third of the total grain crop was fed to livestock in the early 1960s, but livestock herds were a residual claimant; in years of shortfall, their needs were first to be cut. Since 1965, the livestock program has received

higher priority. We estimate half or more of the total grain crop has been for feed during the period 1969-75.

182. The availability and variety of food in the USSR are greater than in the past, and the consumer has made significant gains. There has also been a marked shift away from a reliance on home-produced foods. By 1970, for example, more than 80 percent of the collective farm families' food was purchased at state retail stores and farm markets.

183. Although the Soviet diet is still heavily weighted with starchy foods, it has improved significantly since 1950. Growth in consumption of high-quality foods, such as livestock products, has been accompanied by a reduction in the number of calories supplied by grain and potatoes.

184. The Soviet distribution and marketing systems have been improved, with large cities still favored in the overall distribution. Although processing, packaging, and storage of food are not yet near US levels, they have been expanded. Thus, produce is far less subject to seasonal fluctuations than before and more

TABLE VI  
Supply and Consumption of Grain in the USSR

	1960	1961	1962	1963	1964	1965	1966	1967
Supply .....	126.6	131.6	140.7	111.2	161.1	128.2	179.6	150.8
Domestic Production ...	125.6	130.9	140.1	107.4	152.0	121.1	171.0	147.7
Imports .....	1.0	0.8	0.6	3.8	9.2	7.1	8.6	3.1
Consumption .....	125.0	133.7	138.1	125.9	119.8	137.9	143.4	150.2
Seed .....	24.2	25.8	27.8	28.0	27.2	26.4	25.8	25.8
Food .....	48.1	49.1	49.6	48.0	48.5	50.3	53.3	53.7
Industry .....	2.2	2.0	2.2	2.0	2.4	2.1	2.0	2.3
Exports .....	6.9	7.9	8.3	6.7	4.0	5.3	4.4	6.9
Livestock Feed .....	43.7	48.8	50.2	41.2	37.7	53.8	57.9	61.6
	1968	1969	1970	1971	1972	1973	1974	1975
Supply .....	171.7	163.7	189.7	185.2	183.9	247.0	202.9	171.9
Domestic Production ...	169.3	162.3	186.8	181.2	168.2	222.5	195.7	140.0
Imports .....	2.4	1.4	3.0	4.1	15.7	24.5	7.2	31.9
Consumption .....	155.8	165.5	179.6	190.7	186.1	195.8	207.6	203.8
Seed .....	26.9	25.3	24.6	26.0	25.4	27.0	27.4	27.0
Food .....	54.0	54.2	57.5	58.6	59.4	60.1	57.9	57.0
Industry .....	2.4	2.5	2.8	2.9	3.0	3.1	3.3	2.0
Exports .....	6.4	8.5	6.8	9.7	5.5	6.2	8.8	3.6
Livestock Feed .....	66.1	74.9	87.9	93.4	92.8	99.5	110.2	114.2

Note: Because of rounding, totals may not add to the values shown.

canned goods are available. Largely because of government control and bureaucratic inertia, Soviet food production and distribution are insufficient by US standards, but in an emergency involving serious disruption of the system and food shortages, government control would be an advantage.

185. Following even a large-scale nuclear attack on Soviet urban-industrial and military targets, food production in many areas would probably continue. However, the road-rail transportation system for food distribution would almost certainly be disrupted. The impact of these disruptions on food distribution, would depend on how efficient civil defense units were in managing distribution, in repairing damaged railroads and their equipment and in eliminating bottlenecks on the road networks.

186. *Food Storage:* Food processing is a diverse operation in the USSR, with facilities smaller and less concentrated than in the US. In general, food storage and food processing are activities performed outside urban areas of greater than 50,000 population. While we have some information on other foods, we have concentrated our analysis on the availability of grain, because it is the staple of the Soviet diet. At least 40 percent of Soviet grain is stored on the farms, and most of the remainder is probably kept in rural areas.

187. We do not know exactly how much grain the USSR has in storage. The size of Soviet grain stocks is a carefully guarded state secret. Our estimates of changes in stock levels can only be illustrative primarily because of uncertainties about estimates of livestock consumption and about the difference between official claimed and actual usable grain output. We lack benchmark data to use as a basis for an annual accounting of output, consumption, and reserves. Despite these uncertainties, we have estimated additions and withdrawals from stocks for each crop year (ending 30 June) during the period 1960-76. The net change in stocks for each year is shown in Table VII. Summing these estimates of additions and

TABLE VII

Estimated Change in Soviet Grain Stocks  
by Crop Year, 1960/61-1975/76  
(in million metric tons)

Year	Change	Year	Change
1960/61	- 2	1968/69	+10
1961/62	- 3	1969/70	-11
1962/63	+ 9	1970/71	+ 6
1963/64	-12	1971/72	- 5
1964/65	+31	1972/73	- 6
1965/66	-12	1973/74	+44
1966/67	+34	1974/75	- 7
1967/68	- 2	1975/76	-16

withdrawals does not result in an estimate of current stock levels because we do not know the level of stocks in 1960 or any other year.

188. We estimate that the Soviet grain storage capacity is about 230 million metric tons (100 million on-farm and 130 million off-farm). According to Soviet sources, the total on-farm capacity of grain and oilseed storage facilities, which vary from open-air platforms and pits to well-ventilated, covered buildings, was about 100 million metric tons in 1973. Off-farm storage capacity<sup>36</sup> was reported to be about 125 million metric tons. Off-farm facilities are usually covered, frequently ventilated, and are able to hold grain in good condition for several years (see Figure

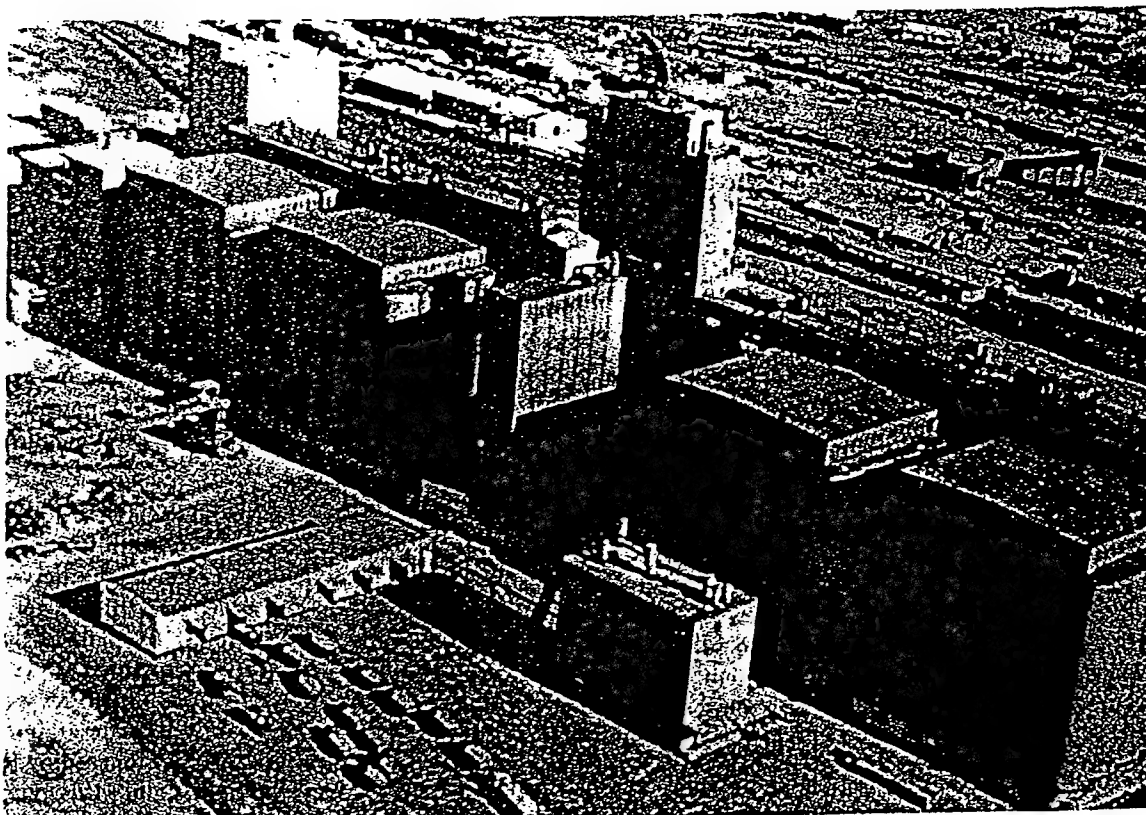
<sup>36</sup> Off-farm, or nonfarm, storage refers to grain not intended for farm use, but it is not synonymous with urban storage. Indeed, the major portion of nonfarm storage is probably located in rural areas, convenient to grain producers.

27). Generally, these facilities are filled as the grain and oilseed crops are harvested and then emptied as the raw materials are used. Since 1973, the USSR has added about 10 million tons to off-farm capacity, and there are large numbers of grain elevators being built. Assuming an arbitrary 5 percent retirement rate in facilities, off-farm capacity would currently be around 30 million tons. We do not know how much has been added to on-farm capacity since 1973.

189. The Soviets have large "state reserves" of food and other materials which they would call upon for use in an emergency. We also have reports that the Soviets have "strategic reserves" of foods (as well as other supplies and industrial materials) for use during wartime. Presumably strategic reserves are levels below which supplies would not be drawn down during peacetime. We do not know whether some part of the grain storage capacity discussed above consti-

Figure 27. Soviet Grain Storage Facility

This facility, in Kazakhstan, contains part of the 130-million-metric-ton off-farm grain storage capacity estimated for the USSR.



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tutes a "strategic reserve" or whether this reserve is in addition to the 230 million metric tons.

190. Human sources have reported hardened bunkers for food storage including grain. Maintenance of dispersed and protected stocks of grain reserves is specifically called for by the 1961 decree establishing the civil defense organization of the USSR. As of mid-1976 we had identified 36 underground grain storage bunkers having similar characteristics (see Figure 28). The bunkers vary in size, with the largest 192 meters long and 96 meters wide (630 by 315 feet). Individual bunker storage capacities—using the weight-volume ratio for wheat—range from approximately 20,000 to 106,500 metric tons (25,000 to 138,000 cubic meters or about 883,000 to 4.9 million cubic feet). Although these bunkers vary in size and configuration, they have several common characteristics. Most are colocated with conventional grain silos or long, low storage buildings and are rail served and secured. All but three of the bunkers have a rail transfer facility and all but one have one or more truck transfer facilities used to offload the grain onto conveyors which extend into the bunkers. (A typical bunkered storage facility area near Kiev is shown in Figure 29). The total storage capacity of the bunkers identified to date is estimated to be 1.7 million metric tons of wheat. Combining the colocated aboveground facilities, the total storage capacity at these locations is about 2.6 million metric tons.

191. The storage sites are 17 to 80 km (10 to 50 mi) from the nearest urban center. According to human sources, the underground bunkers have a ventilation control system and are constructed of reinforced concrete with an earth cover which would enhance the bunker's survival against nuclear weapon effects. Correlations between the distribution of bunkers and concentrations of civilian population or military installations are as yet inconclusive. Evidence concerning the type of grain stored in the bunkers and its intended use remains unconfirmed. The source whose reports permitted the initial identification of the bunkers stated that the bunker-stored grain was a strategic reserve for use in wartime. The limited capacity and the physical characteristics of the bunkers suggest that they were designed to fulfill a specialized and limited postattack requirement, that is, an assured grain supply for a limited number of people.

192. Preliminary research on construction chronology indicates that this bunker program began in the early 1960s. At least one and possibly two bunkers may

have been initiated after 1969, while nine were still under construction in the early 1970s. Construction time varies appreciably, from two to ten years. We believe we have located most of the bunkers of this particular type, but what may be food storage bunkers of different type now have also been observed. Our analysis of food storage bunkers is continuing.

193. The 1.7-million-metric-ton capacity of the bunkers is much less significant for purposes of sustaining the population following a nuclear attack than the amount of grain likely to be available from on-farm and off-farm storage facilities. The 1.7 million metric tons of bunkered grain would represent about 3 percent of the food grains consumed annually by the Soviet population. On the other hand, 1.7 million metric tons is less than one percent of the 230-million-metric-ton capacity of other grain storage facilities. The bunkers are therefore not as significant as a factor in Soviet post-nuclear-attack recovery as they are as an indicator of national policy, confirming that the USSR does maintain strategic reserves.

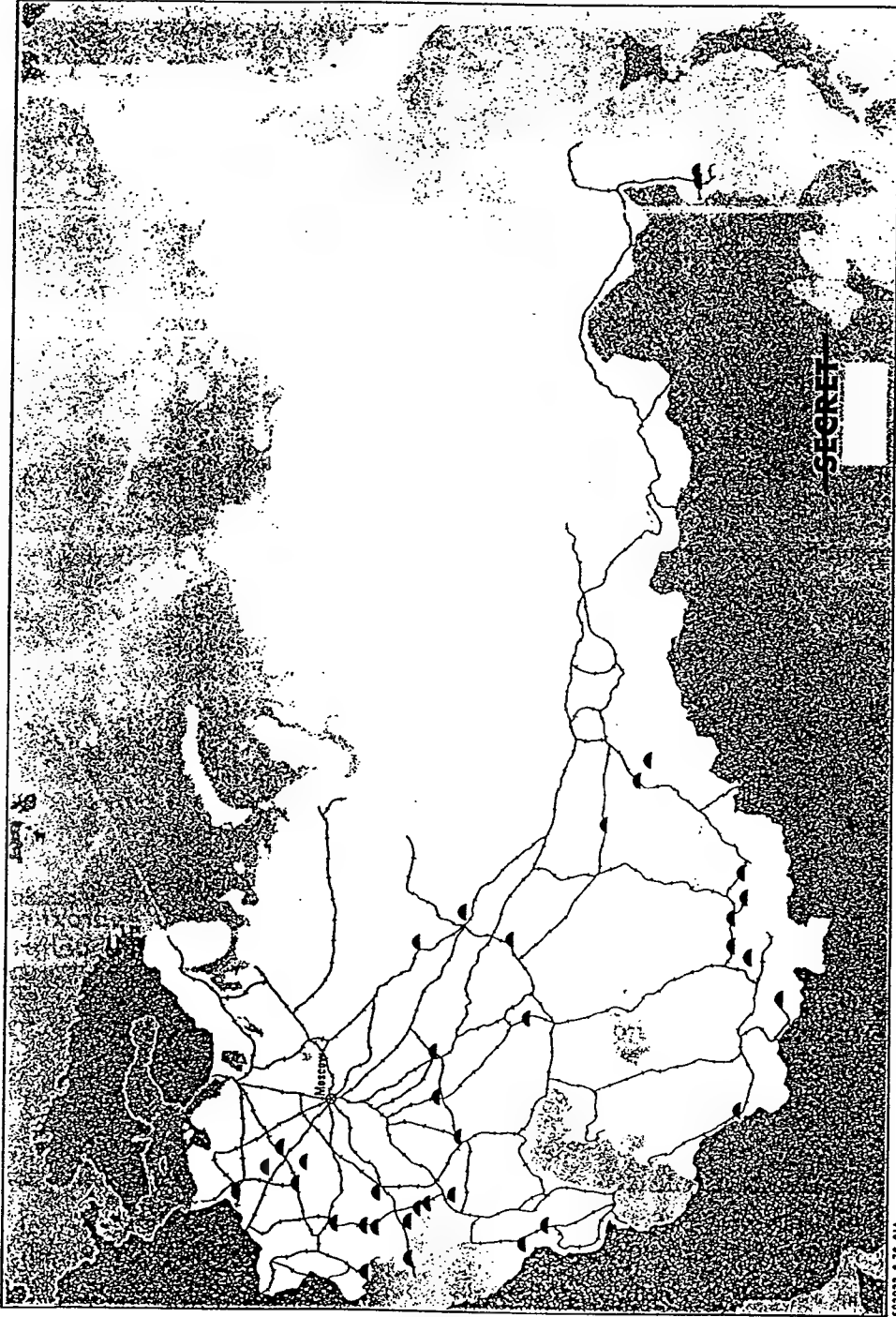
194. Our estimates of Soviet annual supply and consumption of grains since 1960 were shown in Table VI. Soviet grain imports in the 1970s have varied from a little over one percent of domestic output in 1970 to more than 20 percent in 1975, when the harvest was the lowest in over a decade.

195. In 1975 about 40 percent (103.1 million) of the Soviet population (254.5 million) lived in cities with 50,000 or more residents. Urban per capita consumption of grain and grain products averages two-thirds that of rural residents, primarily because urban residents have a larger variety of foods to eat. Thus the population resident in cities of over 50,000 consumes about 30 percent of the grain required for food. This was about 17 million tons in 1975. We estimate that consumption of grain for food required 28 percent of the total estimated grain supply in 1974, and 33 percent in 1975.

196. We do not know, of course, what portions of Soviet grain storage facilities contain grain. Certainly the amounts in storage vary according to the harvest. Although Soviet sources indicate that a high level of reserves is maintained at all times, it is likely that storage facilities were not full following the 1975 harvest failure. Even if off-farm storage facilities were only half full, they would contain adequate grain for the city population for a year as well as for seeding the subsequent crop. The availability of this grain following a nuclear attack would depend on the vulnerability of the storage facilities. We do not know

Figure 28. Grain Storage Bunkers in the USSR

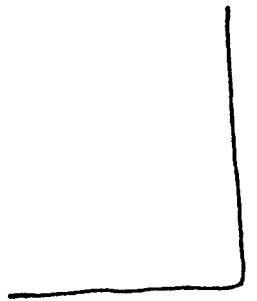
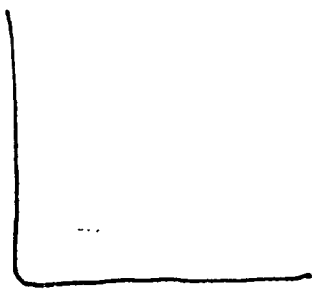
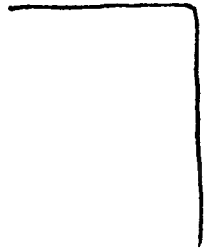
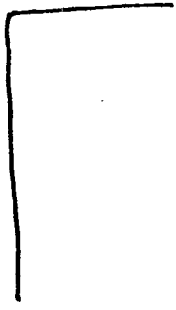
Underground grain storage sites have been identified throughout the USSR, but most are in the west near centers of population concentrations. The map shows the locations of the 36 grain storage bunkers identified to date and their relationship to the Soviet rail network.



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how much off-farm storage is located in urban areas, but we believe much of it is in the countryside, in elevators located along railroads.<sup>37</sup>

197. How long the grain supply would satisfy the requirements of the city population following a nuclear attack would depend on how soon after the attack the flow of food from farm areas was resumed and in what volume. If a substantial flow of food were resumed in a matter of say, a few months, food stocks in general would probably be sufficient to sustain the city population for that period, possibly longer if the conflict began in the fall of the year. Following a nuclear attack, distribution of foods and other supplies, a problem for the Soviets even in peacetime, might be a more limiting factor than food stocks.

198. *Water.* Civil defense must ensure the supply and availability of water in a postattack environment for personnel and industrial needs, and for conducting civil defense operations such as decontamination and firefighting. Thus, planning calls for storage of water supplies in shelters, construction of water reservoirs, enclosing wells, and the rapid repair of ruptured water mains.

199. In attempting to determine the extent to which the Soviets have diversified their sources of water supply, data from nine selected urban centers of economic activity was collected. Research of this data failed to show any effort in the construction of water reservoirs in the last decade. However the availability of water in urban-industrial centers and their environs for postattack operations has not been subject to detailed analysis.

200. There is evidence, however, of preparations for water storage, although the extent of such preparations is unknown. There is evidence of bunkered water storage facilities at some relocation sites and industrial installations. Open sources cite action by a large industrial plant in Moscow to improve its water supply. Five artesian wells were dug and connected to the plant's water system and five underground reservoirs were constructed. As for water supply in dispersal and evacuation areas, Soviet manuals suggest that water be drawn from wells which are to be sealed hermetically. Other sources have reported that the RSFSR civil defense staff had undertaken an extensive program through the republic to drill and seal wells as a method of ensuring an uncontaminated water supply.

<sup>37</sup> The amount and location of off-farm storage are subjects of an intelligence study now underway.

201. *Fuel.* We have information on Soviet peacetime production and consumption of energy. The actual amounts available to the Soviets after an attack would depend not only on the targets struck by the US, but also on the period of preparation prior to the attack during which the Soviets could increase their reserve stocks at all levels—from consumers to fuel producers. As in the case of other supplies critical to survival of the population and post-nuclear-attack recovery, distribution may be a more serious problem than the stock levels available.

202. Hydroelectric power accounts for about one percent of the Soviets' total energy needs; nuclear power sources are a negligible part of the total. Soviet planners probably expect that a large percent of the hydroelectric power would be disrupted. Thus, organic fuels would be the most important energy sources for the post-nuclear-attack period.

203. Soviet production and consumption of fuels by type during 1975 were as follows:

	Production	Consumption
Oil .....	43%	36%
Natural Gas .....	21%	24%
Coal .....	30%	33%
Other .....	6%	7%
(Includes nuclear, hydropower, shale, peat, fuelwood)		

We estimate 1975 fuel positions as follows:

Oil		
Proven Reserves .....	30-40	billion barrels (bbl)
Production .....	9.8	million bbls/day (490.7 million tons)
Consumption .....	7.4	million bbls/day (370 million tons)
Natural Gas		
Proven Reserves .....	23	trillion cubic meters
Production .....	289	billion cubic meters/year
Consumption .....	282	billion cubic meters/year
Coal		
Explored recoverable reserves .....	140	billion metric tons
Production .....	701	million metric tons/year
Consumption .....	685	million metric tons/year

These figures understate the Soviet potential energy resources following a nuclear attack. Should fuel

become a critical shortage in the recovery, the Soviets would almost certainly attempt to acquire fuel from areas on the periphery of the USSR, including the Middle East. Their success in making such acquisitions would depend on the political and military situation and on world energy supply levels.

204. We have no precise estimates for the total amounts of organic fuels in the Soviet pipeline from producers to consumers, for strategic reserves, for seasonal variations in pipeline, or for reserve fuel stock levels. DIA calculations of the storage capacity for refined oil products are as follows (in barrels):

	Normal Stock Levels	Prestrike Capacity With 30 Days' Warning
Refineries and Depots	240,800,000	321,100,000
Rail and Tank Trucks	19,400,000	38,900,000
Pipelines	27,000,000	27,000,000
Total	287,200,000 (29-day supply)	387,000,000 (40-day supply)

Refined products in storage and transit (excluding those being exported) currently total over 287 million barrels, enough to satisfy peacetime oil consumption by civilian, industrial, and military users for about 29 days. Following a nuclear attack, we believe the military would have first priority on oil products, critical industries and services would have second priority, and the general public last.

205. Most storage sites and distribution facilities for natural gas are located in urban-industrial areas likely to be subjected to nuclear attack. Thus, distribution in urban areas of gas, 25 percent of which is used by the general population, would almost certainly be disrupted. Availability of natural gas to the population at evacuation and dispersal sites would depend on the location of the site relative to natural gas pipelines. Assuming that some gas-producing facilities continued to operate, gas pipelines to some industrial or power facilities might continue to function or be restored to operational status within a short period.

206. Coal continues to account for about 30 percent of the energy consumed annually in the USSR. In 1975 Soviet coal production totaled some 700 million metric tons, and coal reserves in the USSR are estimated to be in excess of 200 billion tons. Of the total annual Soviet coal production, however, only about 165 million tons are hard coal. The bulk of Soviet coal is composed of brown and soft bituminous

coals with high moisture content. These coals weather and disintegrate rapidly, ignite spontaneously, and cannot be stored satisfactorily for long periods of time. Although actual stockpiles of coal can vary considerably because of such factors as seasonal variations or preparations taken during the warning period, about 70 million metric tons of coal could be available from stocks on hand prior to the initiation of hostilities. This is equivalent to about 40 days' supply at prestrike production rates.

207. Soviet industry utilized about 81 percent of the coal consumed in the USSR in 1970. Housing and communal services accounted for only 8 percent and the remaining 11 percent was consumed in construction, agriculture, and transportation. Coal accounted for about 36 percent of the electric power produced in the Soviet Union in 1975. Soviet dependence upon coal as an energy resource for electric power production and personal consumption is likely to increase in a recovery period following a nuclear exchange. The distribution of coal would be critical in the poststrike period. Coal is produced in five major basins in the USSR, and about 90 percent is shipped by rail. Coal transport accounts for about 20 percent of the total transport volume of the Soviet state railroad. Major disruptions in this transportation system will impact heavily on the availability of coal for industrial and personal consumption.

208. Soviet civil defense planning calls for providing fuel to principal consumers following a nuclear attack, namely critical industries and the general population as well as the military. Since Soviet planners cannot predict the pattern of surviving fuel reserves, the locations of supplies may not correlate with the needs of high-priority users. We have little information on Soviet preparations to overcome such problems in meeting fuel requirements. Soviet plans for continuity of critical industrial production specify fuel stockpiling and preparing for the use of alternate sources of fuel. Oil storage exists in some evacuation and dispersal areas near cities, but additional analysis is needed to determine the capacity of such sites to serve the relocated urban population. Given the higher priority of the military and certain industrial ministries for oil and oil products, it is more likely that Soviet plans envision that coal would be a principal source of fuel for the general population. Distribution of coal to the population has an advantage in that it can be transported in almost any kind of carrier, but, as noted, Soviet coal is difficult to store in large quantities for long periods because of moisture absorption and spontaneous combustion.

209. As with other critical supplies, we believe sufficient stocks of fuel would be available to sustain the population in the immediate post-nuclear-attack period. Over the short term, because of its bulk, fuel would probably present the most difficult distribution problems for the Soviets. (It should be noted, however, that the Soviet population demonstrated in World War II the ability to survive and to work under circumstances of severe shortages of fuel for private use.) Over the longer term following an attack, fuel production and distribution would likely be a pacing factor for industrial recovery of the USSR.

210. *Medical Supplies.* The USSR is self-sufficient in production of most common drugs, antibiotics, and biologicals. Certain highly sophisticated drugs are imported from the West in small amounts. Poor planning and coordination within the pharmaceutical industry often result in shortages of raw materials and chemical intermediates that delay production of medicines. The quality of most Soviet-produced drugs is adequate, but problems in quality control tend to produce variations in potency. Another significant shortcoming, despite recent efforts at remedy, is substandard packaging of finished pharmaceuticals—a shortcoming that restricts long-term storage capability. Distribution problems also arise occasionally.

211. Laboratory and surgical equipment is manufactured domestically or imported from Eastern Europe, and generally is of acceptable quality. Medical equipment is available in sufficient amounts, but few items of equipment are disposable. The Soviets' more sophisticated electronic medical equipment is generally obsolete by Western standards, but performs adequately. The greatest shortcoming in Soviet medical equipment is lack of standardization and chronic shortages of spare parts due to poor planning of production schedules.

212. The USSR is believed to have extensive reserve stockpiles of medical material, maintained by an agency of the Council of Ministers. These stockpiles contain drugs, antibiotics, vaccines, serums, blood plasma, plasma expanders, bones for transplants, surgical dressings, medical and surgical instruments, hospital and laboratory equipment, and X-ray equipment. According to Soviet sources, strategic reserves must be maintained at all times, regardless of shortages in the civilian sector, and are constantly replaced. It is believed that Soviet aid to underdeveloped areas probably includes drugs drawn from strategic reserves that are nearing their expiration

dates. Many of the specifics of the strategic medical stockpile are not known, including locations, inventories by item, and number of days of supply. A particular deficiency is believed to exist in the Soviet whole blood preservation program for national emergency. The Soviets cannot store whole blood for more than about 21 days.

213. The medical supplies available following a nuclear attack would not be limited to strategic reserve stockpiles. The Ministry of Health maintains civilian medical depots and operates the medical sections in military general supply depots. Reserves of medical materials are located at large hospitals and other medical facilities, and the civilian system of pharmacies maintains warehouses of drugs at distribution points throughout the country. As is the case with designated strategic stockpiles, the normal peacetime reserves of medical supplies controlled by the Ministry of Health are continually replenished, with the older materials being dispensed first.

214. Stockpiles of medical supplies available for civil defense appear to be adequate. [

[ We do not know, however, the location of most of the strategic reserve sites, their size, or the adequacy of their management.

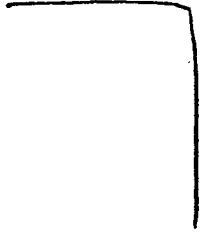
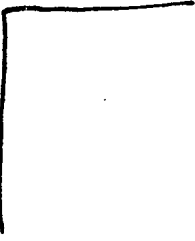
215. The effectiveness of some drugs may well be limited by substandard quality control, unsophisticated packaging, problems of timely distribution, and problems of overstocking of some items. Moreover, there are indications that storage conditions vary from location to location, thus placing some stored drug items in jeopardy. Because of their lesser bulk, medical supplies would present less of a distribution problem, however, than other critical supplies. We agree with the judgment of Soviet sources that the USSR has adequate stocks of acceptable drugs and other medical supplies for use in event of nuclear war.

#### D. Distribution of Essential Supplies

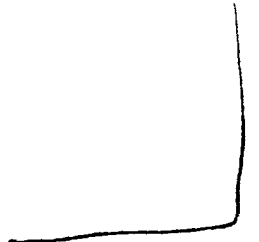
216. Providing for the distribution of essential goods to critical industries and to a displaced and injured population using a damaged transportation system would be one of the most difficult problems for Soviet civil defense planners in recovery operations.

217. The ability of the Soviet transport system to handle military movements, evacuation of the population from urban areas, and the movement of

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essential goods in a post-nuclear-attack environment depends on circumstances which the Soviets cannot predict with confidence. Soviet planners take into account the worst case—a surprise attack on Soviet cities—although they probably regard it as highly unlikely. Such an attack would probably destroy much of the transportation facilities in urban areas and at critical points, but Soviet planning appears to be based on the assumption that a large portion of transportation equipment and facilities outside urban target areas would survive. Probably more important than the amount of facilities and equipment likely to survive would be the availability of electric power, key management personnel, communications, and other transportation support facilities.

218. Even if a nuclear attack against cities came without warning, we assume that much of the transport equipment nationwide still would be operational. Except for structures within urban areas, elements of transportation systems are difficult to target, even using nuclear weapons to attack them, and are not very vulnerable to collateral damage. For example, a 500-kt. weapon would cause only light collateral damage to most transportation equipment two miles or more away from ground zero. Furthermore, at any given time much rail equipment and many trucks are moving between urban areas, and would be largely undamaged by strikes directed at cities.

#### *Railroads*

219. Soviet railroads would be affected most by the disruption of electrical power. If all electrified railroads were out, about 30 percent of Soviet railroads would be affected. These would involve most of the railroads in the western USSR (including the Leningrad-Moscow line), the Trans-Siberian line as far east as Chita, and the route between Khabarovsk and Nakhodka. Currently about half the freight turnover (in terms of ton-kilometers) is carried by electric locomotives, and the other half by diesel locomotives. It is estimated that the Soviets have about 12,000 electric and 25,000 diesel locomotives. Since some disruption of electric power can be expected, the surviving diesel locomotives would be taxed with carrying a larger percentage of the traffic on the railroads. Use of diesel locomotives would depend on the availability of diesel fuel and maintenance facilities.

220. Obviously the current level of rail transport could not be maintained, but the amount of

equipment available would probably be sufficient to keep vital supplies moving at satisfactory levels. It seems extremely unlikely that all segments of electrified railroads would be inoperable. Many of the electric power sources for the railroads are outside key target areas, and would be untouched by an urban attack or relatively easy to restore to service.

221. Total lack of electricity would prevent operation of transport-related computer centers and automatic processes that depend on electricity for power. Many of these functions could be operated on alternate power sources or could be performed manually with much less efficiency.

#### *Motor Transport*

222. Of the estimated 7 million trucks in the Soviet Union, about 1.3 million are used in agriculture and several hundred thousand are assigned to the military. Most of the remainder are in urban areas, but a large number of these would probably remain operable following a city attack especially if sufficient warning were available to carry out Soviet plans to remove them from likely target areas. Human sources state that in recent years the Soviets have endeavored to locate more vehicle parks in areas outside city centers.

#### *Inland Water Transport*

223. Damage from a nuclear attack to inland water transport equipment is likely to be light, except in areas close to weapon ground zeros. The Soviets would probably be able to move supplies along rivers and canals in the period immediately following a nuclear attack. Traffic volume over water routes could be easily increased over peacetime levels by use of expedient carriers.

#### *Air Transport*

224. All types of transport aircraft would be vital assets for recovery operations, especially in the period immediately following an attack. Unprotected aircraft, most of which are usually located near major target areas will probably be put out of commission by a surprise nuclear attack on cities. Aeroflot, the Soviet national airline, has some 2,400 transports and the military has another 1,000 or so. In its day-to-day operations the Soviet transport fleet is vulnerable, but even with a short period of warning, a large percentage of these aircraft could be dispersed to some of the hundreds of airfields outside urban target areas.



### Transport-Related Communications

225. Transport-related communications would be vital to the distribution of supplies in an emergency. As discussed previously, the Soviets are taking measures to increase the survivability of civil defense-related communication facilities. Many communications facilities are not highly vulnerable. For example, at the Nevada testing site in 1955, damage to communications equipment caused by a blast producing a pressure of 11.7 kPa (1.7 psi) "was of such a minor character that it need not be considered here." Some disruption of critical power sources for communications facilities can be expected. However, enough alternate sources of power are available, so that transport-related communications at military and civil defense organizations could probably be maintained. Even with the damage to communications facilities expected in urban areas, surviving facilities would probably be sufficient to permit the Soviets to manage, from the standpoint of communications, the distribution of critical supplies.

### Personnel

226. Whether qualified personnel to operate and manage transportation and distribution of critical supplies would be available following a nuclear attack is a major uncertainty for Soviet planners, but the protection of essential personnel is a civil defense task of highest priority. There are, for example, active civil defense staffs and units at various echelons of the transportation system, whose organization and functions resemble those at other economic installations. Also Soviet plans call for control over all transportation means to be exercised by the armed forces, using military command and control channels, to satisfy both military and civil defense requirements. However, the priority that civil defense would command for transportation assets would depend on the situation.

227. The Soviets can probably be confident that sufficient transportation facilities and equipment would survive an attack preceded by a period of warning to permit distribution of essential food and other supplies to the population. However, in this matter, as in other aspects of civil defense planning, the Soviets cannot be certain about the overall effects of an attack involving several thousand nuclear weapons or their ability to manage effectively the distribution of critical resources to the population while carrying out military operations. The Soviet reaction to these uncertainties is found in their overall

approach to civil defense—to concentrate on perfecting the civil defense organizational structure and its coordination with the armed forces, to provide for the production and distribution of supplies, to improve the effectiveness of civil defense units and supporting services, and to expand their means of communication for control over civil defense operations.

## VII. PROTECTION OF INDUSTRIES

228. Ensuring the continued operation of facilities of national economic significance in wartime is a most important task. According to the Soviets, in a modern war with the use of weapons of mass destruction, "victory will be gained by the country having an economy which, despite losses and damages suffered in the course of the war, maintains the capability of supplying its armed forces with everything they require, and of supplying the country's populace with the foodstuffs and basic necessities."<sup>38</sup>

229. Soviet measures to provide for the continuity of production of industries following a nuclear attack, depending on the extent and success of such measures, could affect US plans for nuclear weapon employment, which call for the destruction of the USSR's capabilities to reconstitute itself as a major power. Protective measures aimed at the continued production of goods essential to the conduct of military operations could, if successful, impact on tactical operations over the short term following a nuclear exchange.

230. In this section we report what we know about dispersal and hardening of Soviet industries, reserve production capacity, stockpiling of supplies and materials, and protection of key industrial workers. We have made no effort to estimate Soviet longer term capabilities to reconstitute industries following a large-scale nuclear attack aimed at destroying them. Neither have we been able to correlate the industries at which some protective measures are in evidence with those which would contribute most to immediate post-nuclear-attack military operations.

231. From the available evidence, we have attempted to confirm explicit policies and objectives for the protection of industries as derived from the Soviets' own writings, and have attempted to assess the progress they are making.

<sup>38</sup> Major General M. Muradyan, Chief of the Armenian Republic Civil Defense Staff, "Raising the Readiness of Civil Defense," *Kommunist* (Yerevan), 3 November 1971, cited in *JPRS Trans. on USSR Military Affairs*, No. 765, 12 December 1971.

232. Soviet concepts for reducing the vulnerability of industry in nuclear war call for a combination of measures, each of which will be discussed in this chapter:

- *The macrodispersal of industries:* This is a long-term program of redistributing industrial production throughout the country, involving the creation of new towns and agglomerations of industries by region.<sup>39</sup>
- *The microdispersal of industry:* This involves establishing more than one industrial facility for critical products, siting of production facilities within an urban area so that a single weapon would not destroy the entire potential of the area for a given type of production, and maintaining a system of reserves of critical supplies and materials.
- *Hardening of industrial facilities:* Hardening is intended to protect vital equipment or entire facilities and, through shelters, to protect key workers.
- *Relocation of industrial facilities:* In the period immediately preceding or during hostilities, certain industries—equipment, materials, and personnel—would move outside the urban target area to sites which had been prepared in advance.

#### A. Macrodispersal of Heavy Industries

233. As a part of military strategy, a deliberate program for macrodispersal of industries would involve spreading industry over a large geographic area so that devastation of any one region or urban area would not completely deny a given product. The ideal outcome would be to make each region of the country self-sufficient in critical products. Soviet writings on civil defense describe this concept as follows:

Measures may be taken nationally to limit the concentration of industry in certain regions. A rational and dispersed location of industries in the territories of our country is of great national economic importance, primarily from the standpoint of an accelerated economic development, but also from the standpoint of organizing

<sup>39</sup> While Soviet publications regularly point out the advantages for civil defense of this type of dispersal, they also acknowledge that the primary motivations are economic and social rather than purely military.

protection from weapons of mass destruction. A uniformly dispersed distribution of plants may be accomplished gradually by developing industry in underdeveloped regions and limiting the construction of new plants in highly industrialized regions.<sup>40</sup>

234. Although Soviet civil defense authorities urge macrodispersion of industry, there is no indication that Soviet industry is being dispersed specifically for civil defense purposes. While a marginal decline in overall industrial concentration has taken place over the last 10 to 15 years, this is almost completely explained by economic factors. Some of the important industries are becoming even more concentrated over time.

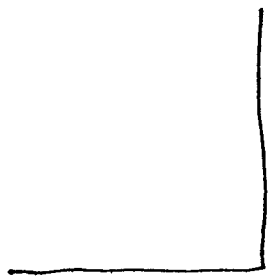
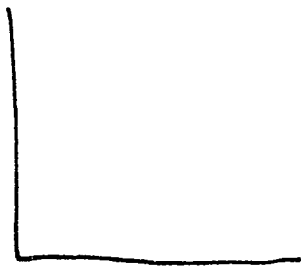
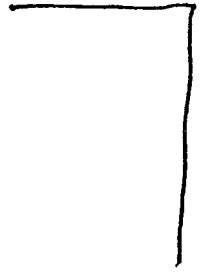
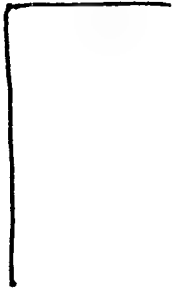
235. Industrial ministries generally resist the expansion to remote areas because of high construction costs and the need to develop an infrastructure of roads, housing, stores, etc. Thus, Soviet managers find it easier to expand existing plants in already developed areas than to build new ones from scratch in relatively remote underdeveloped areas. On the other hand, plant locations are often dictated by the availability and cost of transportation, requiring that they be located either near the source of raw materials or near their customers. The Kama River Track Plant and its associated new town (Naberezhnyye Chelny) for example, are being constructed far from large cities (see Figure 31). The Soviets believe that large plants such as the Kama River plant are more efficient and that they receive economies of scale. This predisposition toward large plants is further illustrated by the fact that the average annual output of a Soviet cement plant doubled between 1960 and 1972.

#### *Historical Perspective*

236. The Soviet policy of intensive industrial development shifted the industrial geography of the USSR. When the Communists assumed power, almost all of Soviet industry was concentrated in four major regions. A new locational pattern evolved from Soviet efforts to establish industries near the source of raw materials and to make each union republic or economic region as self-sufficient as possible. Industry also was to be developed near the consumers and specialization was to be encouraged. As a result, new industrial regions were developed in the eastern section of the country, a process which was acceler-

<sup>40</sup> Yegorov, Shlyakov, and Alabin, *op. cit.*

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ated during World War II with the German occupation of the western part of the country.

237. Following the war, the industrial regions in the west rapidly regained the position they held prior to the outbreak of hostilities. Since then the territorial distribution of gross industrial production has been remarkably stable.

238. During the mid-1950s, the locational pattern of industrial development was publicly debated. The issue was whether to concentrate on industrial development in the east, or to enlarge existing industrial capacity in the west. The decision was in favor of expanded western industries; thus, industrial development in the 1960s showed no appreciable regional shift in manufacturing capacity. Western centers in many cases grew more rapidly than the less developed areas (see Table VIII). While industries for extraction of raw materials were developed in the east, the chief processing industries were still located in the traditional manufacturing centers of the western USSR.

#### Growth in Urban-Industrial Areas

239. Since the mid-1960s, some Soviet planners have voiced concern about unbridled growth of large metropolitan areas, warning of additional social costs and urban blight. They advocate more industrial development (particularly labor-intensive industries) in relatively small and medium-size cities and towns (populations of 100,000 or less), ostensibly to make use of labor resources made available by the mechanization of agriculture. These suggestions are applicable primarily to western republics, such as the Ukraine, where transportation and communications are relatively well developed. Indeed, industrial development probably was increased in many of these small and medium-size western cities. However, labor statistics suggest that little excess labor is readily available to support many additional industrial development projects. Moreover, there is little evidence to suggest that diseconomies from urban-industrial concentrations are halting, or even slowing appreciably, industrial development in the largest metropolitan areas of the USSR. In fact, urban-industrial concentration is becoming more intense in many of the largest Soviet cities.<sup>41</sup>

<sup>41</sup> This is supported by various statistical measures. For example, between 1959 and 1970 industrial concentration as measured by the growth of industrial output per capita increased by 146 percent in Moscow and by 150 percent in Leningrad.

TABLE VIII

Regional Distribution of Industrial Production in the USSR (percent)<sup>1</sup>

Region <sup>2</sup>	1965	1970	1974
RSFSR:			
Northwest <sup>3</sup> .....	8	8	7
Central .....	17	16	16
Volga-Vyatka .....	3	4	4
Central Chernozem .....	2	2	2
Volga .....	7	8	8
North Caucasus .....	5	5	5
Ural .....	9	9	8
West Siberia .....	5	5	5
East Siberia .....	3	3	3
Far East .....	3	2	2
Ukrainian SSR .....	22	22	22
Lithuanian SSR .....	3	3	3
Latvian SSR .....	2	2	2
Estonian SSR .....	3	3	3
Georgian SSR .....	1	1	1
Azerbaijdzhan SSR .....	1	1	1
Armenian SSR .....	1	1	1
Uzbek SSR .....	1	1	1
Kirgiz SSR .....	1	1	1
Tadzhik SSR .....	1	1	1
Turkmen SSR .....	negl	negl	negl
Kazakh SSR .....	1	1	1
Belorussian SSR .....	negl	negl	negl
Moldavian SSR .....	1	1	1

<sup>1</sup> Because of rounding components may not add to 100 percent.

<sup>2</sup> The regional breakdown on which this percentage distribution is based is illustrated in Figure 32. The first 10 areas named are economic regions within the Russian Soviet Federated Socialist Republic. The remaining 14 are other republics of the USSR.

<sup>3</sup> Includes Kaliningrad, administratively under the RSFSR but included in the Baltic Economic Region with the Lithuanian, Latvian, and Estonian republics.

#### Industrial Concentration

240. The trend in the distribution of Soviet industries is also suggested by an analysis

- to compare the number of plants required to account for a given percent of total output between 1960 and 1976 (Table IX), and
- to determine the percent of the estimated value of output of all industrial facilities accounted for by urban areas of different population size (Table X).

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TABLE IX

Number of Plants Producing at Least 50% or 75% at Output for Selected Soviet Industries

Industry	1960		1965		1970		1976		1960-1975 Change in Output
	50%	75%	50%	75%	50%	75%	50%	75%	
Petroleum Refining	6	13	8	17	10	18	9	17	+189%
Steel	10	25	10	25	9	20	8	17	+103%
Motor Vehicles	2	3	2	4	2	5	2	5	+224%
Aluminum	3	5	3	5	4	8	3	7	+197%
Copper	1	3	2	3	2	3	2	5	+138%
Lead	1	2	1	2	1	2	1	2	+74%
Zinc	2	3	1	2	1	2	1	3	+127%
Bulldozers	NA	NA	1	2	1	2	2	3	+142%
Tractors	3	4	3	6	3	5	3	6	+122%
Tanks	2	3	1	2	1	2	2	4	-19%
Aircraft Frames	4	9	6	11	6	11	7	12	-48%
Locomotives	1	3	1	2	1	2	1	1	+2%
Aircraft Jet Engines	4	6	4	6	4	6	4	6	+8%
Electric Power	42	106	46	120	46	126	53	140	+330%

TABLE X

Percent of Value of Soviet Industrial Output by Urban Area Size

Size of Population	1976		
	Number of Urban Areas	% Value	% of Cumulative Value
1,000,000 & above	17	24.16	42.24
500,000-1,000,000	28	18.08	42.24
100,000-500,000	222	35.48	77.72
50,000-100,000	190	9.14	86.86
25,000-50,000	297	5.99	92.85
25,000 & below *	686	7.15	100.00

\* Some facilities in the category 25,000 and below are relatively isolated or in quite small populated places.

241. Table IX shows for 14 important industrial categories the number of plants required to account for at least 50 percent and 75 percent of the total output (or capacity) of all the plants for each selected industry. The table shows that, in spite of large increases in the output of most of these industries and with the exception of electric power, the number of facilities required to account for 75 percent is relatively small and has increased very little over the past 15 years. In the steel industry, for example, the number of plants accounting for 75 percent of total steel production capacity has actually declined from 25 to 17.

242. Table X shows the percent of the estimated value of Soviet industrial production represented by the output from six classes of urban areas. The six classes of urban areas are ordered by population size and the number of urban areas in each class is shown in the table.

243. The conclusions drawn from the analysis are consistent with other measures of industrial concentrations, namely, that

— Most industries have a high degree of concentration of production.

- The output of most of the representative sample of industries selected for analysis more than doubled between 1960 and 1975, but there was only a small increase in the number of plants required to account for 75 percent [
- As in other industrial nations, Soviet industrial production is concentrated in a limited number of large population centers.

### *Territorial Production Complexes*

244. Macrodispersal of industry could result from recent trends toward establishing territorial production complexes. This program is to locate industries in proximity to the source of the raw materials on which they depend. The Soviets expect that this initial step will help to stimulate further developments—machine-building, consumer goods, and service industries. The planning and coordination phase of the complexes now underway poses a massive problem itself, as pointed out in a recent article by the USSR State Planning Committee:

For the rapid and harmonious development of territorial complexes, the organization of thorough technical and economic studies is especially important. As yet, experience has been accumulated only in the drafting of preliminary plans for the long-range development of individual complexes. However, the amount of work is so great that it is necessary to include in it an entire system of design organizations capable of handling the general designing not only of basic production units but also of the entire production and social infrastructure. The regional layouts for territorial complexes that are being drafted in the system of the USSR State Construction Committee should enter into the practical activity of each complex's general designer.

### *B. Macrodispersal of Light Industries*

245. As in most countries, light industry is less concentrated than heavy industry in the USSR. A comparison of the shares of the USSR's industrial output of food and soft goods with shares of total population of selected cities and surrounding oblasts shows that shares of processed-food production correspond more closely with population than do shares of soft-goods production—an important factor in civil defense planning (see Table XI). This is not surprising since the perishability of food products leads to the

consumption of a greater proportion of local production in the immediate area. In all areas the shares of processed-food products are lower than population, probably because of the availability of fresh farm produce not processed by industry, particularly in the rural areas (see Tables XII and XIII). The bulk of the production of processed foods and soft goods occurs in the major centers of population, a pattern which changed little between 1965 and 1974.

246. Quantification of potential product surplus or deficit in processed foods and soft goods for each region can be accomplished by computing product densities for each region.<sup>42</sup> (These densities are tabulated in Tables XIV and XV). Except for the Central Chernozem Region, North Caucasus, and Kaliningrad Oblast, the RSFSR is generally deficient in capacity to feed its population solely from the processed-food industry. Likewise, the Transcaucasus and Central Asia generally are not self-sufficient. It appears that the bulk of the country would have to rely on the Central Chernozem Region, the Ukraine, and the Baltic republics for industrially processed food. This picture changes only slightly for the soft-goods industry. Generally, the relationships tend to be more balanced, however—i.e., regions have some surplus products and some deficit products.

247. These results, when contrasted with the densities for industry as a whole, show virtually no relationship between total industrial density and the densities of the consumer nondurables industries. This suggests that the locational pattern of the consumer industries is atypical of industry in general.

### *C. Microdispersal of Industries*

#### *Siting of Industries*

248. Siting production facilities within urban areas to reduce their vulnerability to a single weapon is most practical in newly developing areas of the USSR. In already developed areas, a massive relocation of industry would be necessary to have a substantial impact on reducing the area's vulnerability. In many urban areas where industry is concentrated, new industrial plants have been built in the outskirts.

<sup>42</sup> Density is defined as the ratio of the percentage share of the output of the given product to the percentage share of population in the region. Ignoring foreign trade—a reasonable assumption under a prolonged civil defense emergency—a density greater than "one" implies a relative regional production surplus; a density less than one implies a relative deficit, i.e., the region is producing less than it consumes.

TABLE XI  
USSR: City and Oblast Shares of Population and Selected Light  
Industrial Production, 1974 \*  
(percent)

City/Oblast	Oblast Share of USSR Population	City Share of Oblast Population	Share of USSR Production												
			Sugar	Meat	Butter	Vege- table Oil	Canned Goods	Leather Foot- wear	Knitted Outer- wear	Knitted Under- wear	Cotton Fabrics	Wool Fabrics	Linen Fabrics	Silk Fabrics	Cotton Fibers
Gorkiy .....	1.44	35.13	0.10	1.10	1.24	0.17	0.20	0.89	0.68	0.04	0.03	0	2.00	0	0
Kiev .....	1.51	51.01	3.81	1.49	1.23	0.08	0.83	4.40	2.03	2.62	0.07	0.72	0	4.13	N.A.
Kuybyshev .....	1.19	38.74	0.14	1.00	0.79	1.19	0.15	0.34	0.55	0.13	0	0	0	0	0
Leningrad City .....		74.25	0	1.45	0	0.66	0.63	4.55	2.84	2.36	2.56	2.53	0	3.51	0
Leningrad Oblast ..	2.29		0	1.84	0	0.66	0.93	5.19	3.54	2.36	2.56	2.71	0	3.51	0
Minsk .....	1.06	42.38	1.12	1.27	1.06	0	0.49	0	1.46	1.35	N.A.	4.35	0	N.A.	0
Moscow City .....		55.68	0	2.11	0	0	0.41	4.61	4.73	3.93	6.08	15.81	0	21.18	0
Moscow Oblast .....	5.41		0	3.11	0.06	0	0.48	5.85	9.00	5.63	22.69	32.78	0	26.61	0
Novosibirsk .....	1.00	49.74	0	1.25	1.77	0.01	0.17	0.75	0.85	0.37	0.14	0	0	0	0
Odessa .....	0.99	39.79	2.92	1.17	1.28	3.76	2.70	0.88	0.71	0.94	0.03	1.08	0	0.07	0
Sverdlovsk .....	1.73	26.17	0	0.98	0.17	0	0.06	2.33	1.43	0.02	0	2.03	0.55	0	0
Tashkent .....	1.23	49.02	0	0.49	0.02	1.40	1.06	1.72	1.30	1.05	2.59	0	0	0.01	5.93
Kharkov .....	1.17	45.85	2.97	1.27	1.23	2.70	0.66	1.55	3.23	1.98	0.24	0.97	0	0.01	0
Total .....	19.07	49.36	11.06	14.97	8.85	9.97	7.73	23.90	24.78	16.49	28.35	44.67	2.55	34.34	5.93

\* The table includes all Soviet cities with populations greater than one million except Baku and Tbilisi, capitals of the Azerbaydzhan and Georgian republics, which were omitted because no production data were available. All data are for oblasts unless otherwise stated. See Figure 32 for location.

TABLE XII

Regional Distribution of Selected Processed Food Production in the USSR  
(percent) <sup>1</sup>

Region <sup>2</sup>	Sugar		Meat		Butter		Vegetable Oil		Canned Goods	
	1965	1974	1965	1974	1965	1974	1965	1974	1965	1974
RSFSR:										
Northwest .....	negl	negl	4	3	3	2	1	1	2	3
Central .....	2	2	9	8	8	8	1	1	4	3
Volga-Vyatka .....	negl	negl	2	3	3	4	1	negl.	1	1
Central Chernozem .....	14	12	4	5	6	6	10	7	3	3
Volga .....	2	3	8	8	8	9	6	6	6	5
North Caucasus .....	9	10	9	8	6	4	22	21	16	16
Ural .....	negl	negl	6	5	5	5	1	1	1	1
West Siberia .....	1	negl	6	6	9	8	1	1	3	2
East Siberia .....	negl	negl	4	3	2	2	negl	negl	2	1
Far East .....	1	1	1	1	1	1	1	1	4	5
Kaliningrad .....	negl	negl	negl	negl	1	1	negl	negl	1	1
Ukrainian SSR .....	61	57	21	22	26	26	31	34	24	25
Lithuanian SSR .....	2	2	3	3	3	4	negl	negl	2	2
Latvian SSR .....	2	2	2	2	3	3	1	1	2	2
Estonian SSR .....	negl	negl	1	1	2	2	negl	negl	1	2
Georgian SSR .....	1	negl	1	1	negl	negl	negl	negl	2	2
Azerbaijdzhan SSR .....	negl	negl	1	1	negl	negl	1	1	2	2
Armenia SSR .....	negl	negl	negl	1	negl	negl	negl	negl	2	2
Uzbek SSR .....	negl	negl	2	1	1	1	11	12	3	4
Kirgiz SSR .....	2	2	1	1	1	1	1	1	1	1
Tadzhik SSR .....	negl	negl	1	negl	negl	negl	2	3	2	2
Turkmen SSR .....	negl	negl	negl	negl	negl	negl	1	1	negl	negl
Kazakh SSR .....	2	2	8	7	4	4	2	2	3	3
Belorussian SSR .....	1	2	4	6	5	7	1	1	4	4
Moldavian SSR .....	3	3	2	2	1	1	5	5	10	10

<sup>1</sup> Because of rounding, components may not add to 100 percent.

<sup>2</sup> See Figure 32.

Nondefense aspects of city planning probably would inspire similar results.

249. The Soviet civil defense literature has cited at least six ways to achieve a microdispersal of industry:

- reducing or limiting building density by prohibiting entry of new industry in concentrated locales;
- constructing wide roads so that rubble will not impede transportation;
- creating green areas (forest belts) to separate industry from other activity;
- creating reservoirs (apart from the needs for human consumption, water is a necessary input for many industries);
- creating an outer zone to which workers may be safely dispersed and where their physical requirements may be satisfied; and

— building circumferential highways to help maintain the transportation network.

250. Some surveys indicate that in some instances, the construction of new industrial facilities, including whole new towns, is being carried out in accordance with these guidelines. There are indications that civil defense considerations play some role in microdispersal of industries. In Bratsk, for example, the aluminum and lumber combines were reportedly placed in sites where floods caused by an attack on the Bratsk dam would not affect them. Also, special attention was paid to creating wide roadways in the town of Naberezhnyye Chelny with a minimum width of 85 meters (279 feet). Nevertheless, the guidelines are generally common to any well-planned urban environment serving a peacetime as well as a civil defense function, and the survey noted above suggests they are not always followed. Figure 33 depicts the microdispersal of industrial potential in selected large urban areas.



**TABLE XIII**  
Regional Distribution of Selected Soft Goods Production in the USSR  
(Percent)<sup>1</sup>

Region <sup>2</sup>	Shoes		Knitted Outerwear		Knitted Underwear		Wool Fabric		Linen Fibers		Silk Fabric		Cotton Fabric		Cotton Fibers		Unprocessed Silk	
	1965	1974	1965	1974	1965	1974	1965	1974	1965	1974	1965	1974	1965	1974	1965	1974	1965	1974
RSFSR:																		
Northwest .....	9	6	9	6	8	8	4	3	5	6	7	4	3	3	3	negl	negl	negl
Central .....	16	13	24	14	15	12	54	47	64	62	67	47	73	67	negl	negl	negl	
Volga-Vyatka .....	4	4	1	2	4	3	1	1	3	3	negl	negl	2	2	negl	negl	negl	
Central Chernozem .....	2	2	5	3	2	2	3	3	negl	negl	negl	1	negl	negl	negl	negl	negl	
Volga .....	6	6	1	4	5	5	8	9	5	4	negl	3	2	3	negl	negl	negl	
North Caucasus .....	7	7	3	4	2	2	3	3	negl	negl	negl	negl	1	1	negl	negl	negl	
Ural .....	7	7	4	5	4	3	2	2	1	1	negl	7	negl	negl	negl	negl	negl	
West Siberia .....	3	3	3	3	3	3	1	1	1	1	negl	negl	3	2	negl	negl	negl	
East Siberia .....	2	2	2	3	1	2	negl	3	negl	negl	4	3	1	1	negl	negl	negl	
Far East .....	negl	1	negl	1	negl	1	negl	negl	negl	negl	negl	negl	negl	negl	negl	negl	negl	
Kaliningrad .....	negl	negl	1	1	negl	negl	negl	negl	negl	negl	negl	negl	negl	negl	negl	negl	negl	
Ukrainian SSR .....	20	23	17	16	21	20	6	10	5	9	5	10	3	5	negl	negl	negl	
Lithuanian SSR .....	2	1	4	3	4	4	2	2	3	3	2	2	negl	negl	negl	negl	negl	
Latvian SSR .....	2	2	3	4	4	4	3	3	2	2	1	1	1	1	negl	negl	negl	
Eastonian SSR .....	1	1	1	1	1	1	1	1	2	1	negl	negl	2	2	negl	negl	negl	
Georgian SSR .....	2	2	3	3	2	2	1	1	negl	negl	2	3	1	1	negl	negl	negl	
Azerbaijdzhan SSR .....	2	2	1	2	2	2	1	1	negl	negl	1	2	2	2	negl	negl	negl	
Armenian SSR .....	2	2	2	3	5	5	1	1	negl	negl	1	1	1	1	negl	negl	negl	
Uzbek SSR .....	3	3	3	3	2	3	negl	negl	negl	negl	4	6	4	3	67	64	35	
Kirgiz SSR .....	1	1	1	1	1	1	1	1	negl	negl	1	1	negl	1	3	3	4	
Tadzhik SSR .....	1	1	negl	1	1	1	negl	negl	negl	negl	4	3	1	1	11	10	12	
Turkman SSR .....	negl	negl	negl	negl	1	negl	negl	negl	negl	negl	negl	negl	negl	negl	8	13	10	
Kazkh SSR .....	3	4	4	6	4	5	1	2	negl	negl	negl	negl	negl	1	4	4	negl	
Belorussian SSR .....	6	6	5	8	6	7	5	5	10	8	negl	2	negl	1	negl	negl	negl	
Moldavian SSR .....	1	2	1	2	1	4	negl	negl	negl	negl	1	2	negl	negl	negl	negl	4	

<sup>1</sup> Because of rounding, components may not add to 100 percent.

<sup>2</sup> See Figure 32.

TABLE XIV

Regional Densities of Selected Processed Food Products in the USSR

Region *	Sugar		Meat		Butter		Vegetable Oil		Canned Goods	
	1965	1974	1965	1974	1965	1974	1965	1974	1965	1974
RSFSR:										
Northwest .....	0	0	.74	.68	.50	.46	.14	.13	.47	.50
Central .....	.14	.14	.74	.76	.68	.72	.09	.07	.33	.29
Volga-Vyatka .....	.04	.09	.64	.90	.86	1.32	.21	.05	.22	.22
Central Chernozem .....	4.09	3.89	1.26	1.52	1.83	2.09	2.79	2.41	.94	1.07
Volga .....	.27	.35	1.10	1.00	1.09	1.20	.77	.90	.77	.61
North Caucasus .....	1.55	1.76	1.59	1.34	.98	.67	3.73	3.46	2.76	2.66
Ural .....	0	0	.93	.91	.82	.88	.11	.18	.19	.17
West Siberia .....	.10	.09	1.19	1.19	1.69	1.58	.20	.17	.52	.47
East Siberia .....	0	0	1.18	1.04	.75	.74	0	.02	.49	.42
Far East .....	.25	.38	.40	.49	.48	.44	.58	.28	1.69	1.80
Kaliningrad .....	0	0	1.57	1.60	2.46	1.48	0	0	3.64	4.08
Ukrainian SSR .....	3.09	2.98	1.08	1.16	1.34	1.35	1.60	1.75	1.20	1.29
Lithuanian SSR .....	1.18	1.32	2.21	2.61	2.62	2.93	.20	.12	1.29	1.26
Latvian SSR .....	1.73	2.53	1.69	1.96	3.28	2.97	.75	.76	2.42	2.11
Estonian SSR .....	0	0	2.24	2.31	3.64	3.81	0	0	2.44	2.91
Georgian SSR .....	.28	.19	.30	.37	.05	.04	.13	.24	1.01	1.10
Azerbaijdzhan SSR .....	0	0	.28	.29	.15	.16	.43	.43	.96	.93
Armenian SSR .....	.32	.09	.45	.45	.30	.12	.34	.35	1.96	2.23
Uzbek SSR .....	0	0	.38	.24	.14	.13	2.44	2.19	.72	.68
Kirgiz SSR .....	1.38	1.72	1.14	.84	.61	.50	.54	.47	.74	.68
Tadzhik SSR .....	0	0	.46	.34	.18	.19	2.04	1.99	1.36	1.17
Turkmen SSR .....	0	0	.37	.27	.21	.21	1.73	1.45	.17	.31
Kazkh SSR .....	.30	.32	1.50	1.30	.80	.68	.40	.45	.66	.49
Belorussian SSR .....	.31	.64	1.19	1.60	1.44	1.81	.25	.16	1.02	.99
Moldavian SSR .....	2.15	1.98	1.04	1.09	.76	.72	3.30	3.45	6.61	6.46

\* See Figure 32.

### Redundancy

251. The Soviet Union has acquired considerable redundancy of facilities to produce some military items. For example, there are possibly four tank plants and three plants for tank engines. Armored personnel carriers are produced in five locations, usually by large plants with large product mixes. However, these plants are not known to be hardened or to have underground production facilities.

252. The redundancy in tank facilities was not entirely planned. Production was initiated in heavy equipment plants that could handle tank production processes and was relocated because of the exigencies of World War II. Soviet tank production still takes place in Nizhniy-Tagil and Omsk, sites to which the production teams and facilities of the Leningrad "Kirov" and the Kharkov tank plants were relocated in World War II. After the war the Kharkov facility was restored and has resumed the production of tanks. Moreover, with the exception of the Kurgan Armored

Vehicle Plant, which is located in the Urals between Omsk and Sverdlovsk, all the plants producing armored personnel carriers are located in heavily industrialized areas of the European USSR, in plants that were making military goods before World War II.

### Industrial Reserve Capacity and Stockpiles

253. The reserve capacity of Soviet industry has received little research attention both because of the paucity of data and because of the nebulous character of the concept of capacity.<sup>43</sup> The tendency has been to assume that the capital-starved and production-maximizing Soviet economy does not willingly tolerate below-capacity production. While the reluctance of the Soviets to retire outdated industrial capacity from the current production stream appears to support this view, some evidence that unused industrial

<sup>43</sup> Thus far, the major intelligence effort in this direction is contained in ER IR 73-3, *The Location of Soviet Manufacturing Capacity: An Appraisal*, March 1973.

TABLE XV

Regional Densities of Selected Soft Goods in the USSR

Region *	Shoes		Knitted Outerwear		Knitted Underwear		Wool Fabric		Linen Fabric		Silk Fabric		Cotton Fabric	
	1965	1974	1965	1974	1965	1974	1965	1974	1965	1974	1965	1974	1965	1974
	RSFSR:													
Northwest .....	1.69	1.12	1.83	1.21	1.60	1.55	.71	.54	1.00	1.28	1.32	.72	.67	.53
Central .....	1.36	1.13	2.08	1.28	1.34	1.11	4.73	4.24	5.55	5.59	5.82	4.20	6.34	6.03
Volga-Vyatka .....	1.14	1.08	.42	.56	1.00	.92	.16	.17	.88	.84	0	0	.50	.47
Central Chernozem .....	.44	.57	1.47	1.04	.70	.54	1.01	.33	0	0	0	.19	.02	.05
Volga .....	.83	.84	.67	.49	.67	.73	1.08	1.24	.64	.51	0	.42	.26	.43
North Caucasus .....	1.28	1.21	.46	.62	.43	.42	.59	.43	.04	.07	0	0	.10	.23
Ural .....	1.01	1.13	.68	.90	.59	.55	.29	.34	.03	.09	1.68	1.17	.03	.04
West Siberia .....	.50	.52	.48	.62	.53	.36	.11	.11	.14	.15	0	0	.51	.47
East Siberia .....	.55	.52	.58	1.10	.40	.59	.12	1.11	0	0	1.32	1.08	.38	.26
Far East .....	.10	.30	.18	.29	.19	.35	0	0	0	0	0	0	.07	.07
Kaliningrad .....	.22	1.10	3.38	3.47	1.31	.92	0	0	0	0	0	0	0	0
Ukrainian SSR .....	1.00	1.20	.88	.82	1.05	1.06	.33	.52	.26	.45	.26	.54	.13	.24
Lithuanian SSR .....	1.34	1.12	2.77	2.38	2.76	3.56	1.78	1.69	2.42	1.98	1.34	1.60	.25	.75
Latvian SSR .....	1.95	1.58	3.54	4.21	3.63	2.89	2.98	2.60	2.41	2.70	1.15	1.22	.86	.80
Estonian SSR .....	2.13	1.57	2.40	2.12	1.79	2.41	1.82	1.76	2.92	1.52	.60	.70	3.57	4.42
Georgian SSR .....	1.16	1.01	1.33	1.44	1.26	1.03	.48	.55	0	0	1.12	1.46	.43	.43
Azerbaijan SSR .....	.83	.88	.32	.7	.88	.87	.70	.98	0	0	.56	.92	.93	.73
Armenian SSR .....	1.58	1.38	2.30	3.02	5.42	4.42	1.11	.69	0	0	.88	1.10	.79	.51
Uzbek SSR .....	.64	.65	.63	.50	.51	.54	0	0	0	0	.88	1.10	.79	.51
Kirgiz SSR .....	.79	1.09	1.07	1.13	1.02	.92	.63	.97	0	0	.79	.47	.02	.45
Tadzhik SSR .....	.67	.74	0	.59	.59	.49	0	0	0	0	3.28	2.54	.99	1.04
Turkmen SSR .....	.45	.35	.52	.43	.91	.49	.22	.16	0	0	.01	.41	.34	.30
Kazakh SSR .....	.59	.77	.71	1.10	.80	.88	.21	.36	0	0	0	0	.06	.21
Belorussian SSR .....	1.54	1.66	1.41	2.30	1.58	1.87	1.46	1.41	2.61	2.23	.08	.49	.03	.38
Moldavian SSR .....	1.02	1.11	.95	1.05	.83	2.66	.34	.10	0	0	.60	1.24	.02	.03

\* See Figure 32.

capacity does exist appears aperiodically in human source reports. <sup>44</sup>

254. One such report indicates that industrial plant managers frequently overstate the amount of equipment capacity being utilized in order to avoid future demands for increasing the utilization of machinery and equipment and to maintain a buffer against increases in production plans. This suggests that some unused capacity exists which probably could and would be used under emergency conditions.

255. The extent to which industrial enterprises can continue producing in the event that their supply of raw materials inputs is interdicted also constitutes a form of reserve capacity. This, in turn, is a function of raw material inventories, stockpiles, and the relationship between inputs and outputs. There is scant

<sup>44</sup> To the extent that industrial capacity to produce a given product exceeds current production, some regions with product densities of less than one could become self-sufficient and even come to possess a small reserve.

evidence concerning the magnitude of raw material stockpiles because such data generally fall within the realm of state secrets. Some rough estimates of the amount of time production could continue by drawing down inventories, based on a 1966 input-output model of the Soviet economy using Soviet data, are shown for selected industries in Table XVI.

256. As indicated in column 6 of the table, none of these industries could continue more than a few weeks without access to additional raw materials. It is difficult to extrapolate these results, which are based on 1966, to the present time. Evidence suggests that inventories are erratic, especially in those sectors heavily dependent on agriculture. On the other hand, the Soviets placed greater emphasis on preparations for the continuity of industrial production beginning in the late 1960s.

257. Another source of supply for both raw materials and final goods is the Soviet state reserve

TABLE XVI  
Number of Years Soviet Production Could Continue in the Absence of  
Further Supplies of Raw Materials, 1966

Producing Sector	(1) All Inputs	(2) Fuel Inputs	(3) Spare Parts	(4) Other Material Inputs	(5) Output Inventory	(6) Total Period of Operation*
Metallurgy .....	.116	.048	≅ .522	≅ 152	.144	.192
Coal .....	.090	.002	≅ .162	≅ .208	.061	.063
Oil and Gas .....	.081	.002	≅ 608	≅ .261	.013	.015
Electric Power .....	.228	.097	≅ 1.696	≅ 2.265	.024	.121
Machine Building and Metalworking .....	.265	.170	≅ .022	≅ .488	.179	.201
Chemicals .....	.134	.027	≅ .197	≅ .143	.065	.092
Wood .....	.183	.180	≅ .346	≅ .173	.099	.272
Construction Materials .....	.164	.055	≅ .462	≅ .161	.051	.106
Soft Goods .....	.169	.252	≅ .408	≅ .167	.040	.207
Processed Food .....	.068	.143	≅ .278	≅ .066	.043	.109
Other Industries .....	.669	.087	≅ .044	≅ 1.181	.122	.166

\* Length of time output inventories would last (column 5) plus length of time the most constraining input would last at current production levels.

system, on which there is little current reliable information. There are three categories of Soviet state reserves. The first is designed to maintain continuity of planned production in the event of a serious interruption of normal supplies. The second is designed to permit the rapid conversion of the economy to a wartime basis, under mobilization plans. Both these categories of commodities are stored at plants and warehouses of the economic ministries. The third consists of stocks held at state reserve bases, for use in extreme emergencies when all other stocks have been exhausted.

258. Soviet state reserves are thus very much broader in character and purpose than the "strategic stockpiles" of Western countries. Moreover, state reserve operations penetrate the economy to such an extent that they necessarily involve a large pipeline operation. A considerable portion of current Soviet consumption of some commodities is regularly supplied by planned releases from state reserves.

259. It is upon these large, flexible, all-inclusive state reserves that the USSR must depend to meet any large-scale or long-term emergency. In time of war they would furnish the material means for converting the economy to war production, in accordance with economic mobilization plans, for maintaining economic life in areas isolated by military action, and for limited, direct support of military forces. In peacetime they are called upon to lessen the effects of breakdowns in production and distribution and to

give the USSR a certain degree of regional self-sufficiency. While there is no precise measure of the size of Soviet state reserves, the state reserves bases distributed in each area probably would furnish the food and materials necessary to sustain the given area for a period of at least several months.

260. As noted in Chapter VI, maintenance of dispersed and protected stocks of grain reserves is specifically called for by the 1961 decree establishing the civil defense organization of the USSR. The quantity and distribution of Soviet grain reserves are particularly critical factors in determining the ability of a region to supply its population with food during an emergency. Grain reserves and bunkered grain storage facilities are discussed in that chapter in connection with food supplies for the Soviet population following a nuclear attack.

#### D. Hardening of Economic Installations

261. Hardening of economic installations refers to the full range of engineering measures taken to improve the "operational stability" of individual installations in wartime. By stability the Soviets mean the capability of installations to produce according to plan and "presumes the rapid restoration of production which has been disturbed as a result of the enemy's use of mass destruction weapons."<sup>46</sup> There are degrees of hardening ranging from construction of

<sup>46</sup> Kotlukov, Ogloblin, and Sgilevskiy, *op. cit.*

underground facilities and protective engineering techniques to expedient measures for the protection of equipment. While we are beginning to have some idea of the scope of underground construction, we lack evidence on the degree to which other hardening techniques and measures are being applied. The goals of the program for hardening industrial facilities were described in a 1970 Soviet publication as secondary to economic considerations:

Increasing the survivability of buildings and structures may be achieved when planning new construction as well as when rebuilding installations. . . . However, these measures are taken only if they are economically feasible.<sup>46</sup>

Undoubtedly many industrial ministries have been loath to spend their limited investment rubles on civil defense measures which in no way will help the ministry achieve production targets. On the other hand, more recent Soviet statements, and classified sources report a growing trend to mandatory inclusion of civil defense related engineering and technical measures in plans for new industrial construction.

#### Hardening Techniques

262. Marshal Chuykov wrote in 1969 that marked reductions in the damage to industry from secondary nuclear effects could be achieved at low cost:

There are tested techniques and measures to be used in industrial construction that can lessen destruction and reduce the likelihood of secondary explosions and fires. Preliminary calculations show that they can lessen the effects of a nuclear attack by approximately 80 to 90 percent without great monetary and material expenditures.<sup>47</sup>

263. In a recent publication, the Soviets outlined engineering and technical measures that would enhance survivability of economic facilities. This pamphlet, published in almost a quarter of a million copies, uses as an example the measures taken at the Moscow First State Ball-Bearing Plant to increase the hardness of that plant.<sup>48</sup> Some of the tasks accomplished were:

- removing wooden and flammable material in floors and roofs, replacing these with concrete and noncombustible materials;

<sup>46</sup> Yegorov, Shlyakov, and Alabin, *op. cit.*

<sup>47</sup> "Civil Defense in Our Common Cause," 1969.

<sup>48</sup> Gromov and Krechetnikov, *Civil Defense of an Industrial Project*, Moscow: Atomizdat, 1975 (translated in part in JPRS 64776, 16 May 1975).

- burying utility lines;
- building shelters to protect workers;
- digging artesian wells to ensure an adequate water supply; and
- constructing a sheltered substation for plant compressors.

264. Although the Soviets describe these measures in terms of civil defense, some of these procedures in the US would constitute programs of modernization completely devoid of civil defense content. Other civil defense measures described in Soviet writings include "increasing equipment stability" by replacing obsolete machinery, reducing the number of different model types, building up a reserve of spare parts, and developing fully automated machinery. These actions, in line with Soviet policy, would be justified on grounds that they would enhance peacetime production and at the same time reduce the plant's vulnerability to nuclear attack.

265. In cases where hardening would neither add to industrial production nor lead to some cost savings, the industrial ministries would resist such measures. As Gosstroy succeeds in incorporating standard civil defense features into building designs and modernization programs, construction cost savings may be realized.

266. In addition to the more costly forms of hardening measures, Soviet open-source publications such as the Civil Defense Handbook describe various expedient measures for protecting industrial installations. Among the most basic measures to be taken are those requiring the orderly shutdown of an industrial operation. Expedient hardening measures include:

- reinforcing buildings and structures with cables and supports;
- removal of combustible materials and other fire prevention measures; and
- covering equipment, structures, and buildings with earth and sandbags.

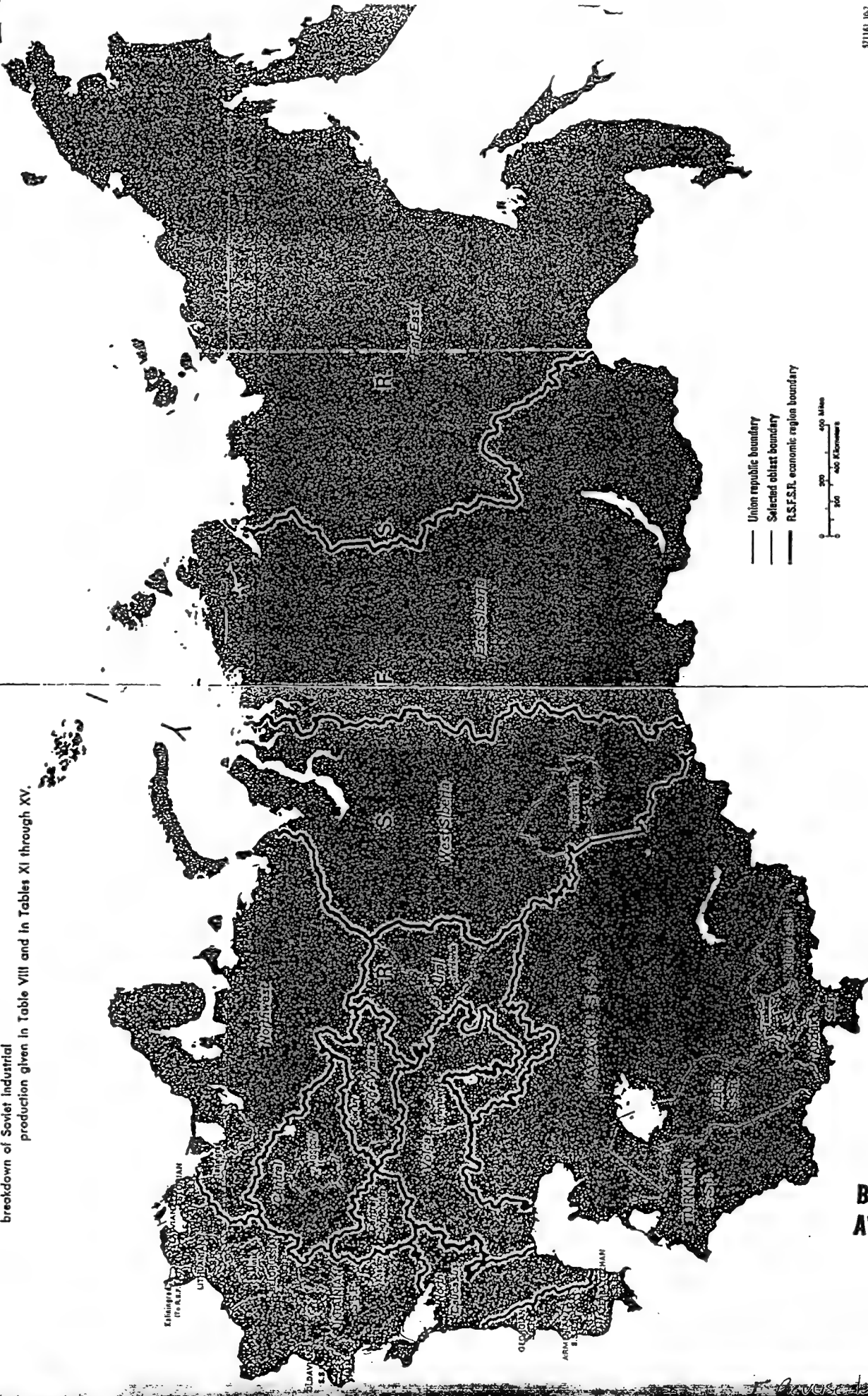
A study of expedient hardening techniques for possible application in US industries indicates that such measures could markedly reduce damage to industrial equipment from nuclear weapons under some circumstances.

267. According to Soviet writings, the engineering and technical hardening measures described above are being applied generally in industrial installations,

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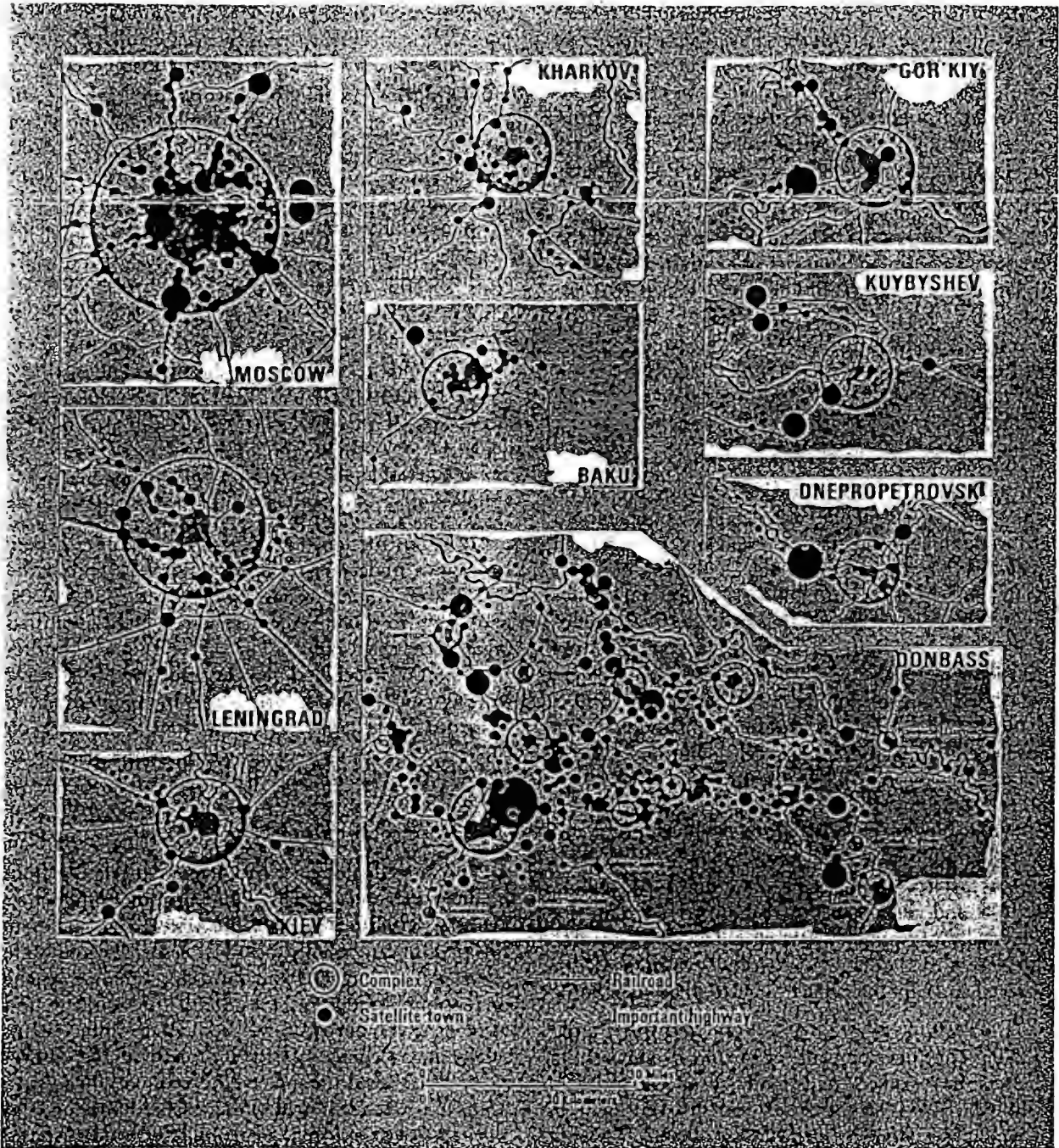
Figure 32. Soviet Republics, RSFSR Economic Regions, and Selected Clites and Oblasts

This map provides geographic references for the regional distributions percentage breakdown of Soviet industrial production given in Table VIII and in Tables XI through XV.



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Figure 33. Selected Satellite Towns and Urban Complexes in the USSR



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while expedient hardening techniques would be undertaken as necessary. There is, however, little intelligence information to confirm the extent to which any of these measures and techniques are being carried out. Features such as shelter construction have been noted by human sources, but most of them have not been interrogated in detail about other industrial hardening techniques, nor have they had the technical background to report on them. Thus, our understanding of the extent to which Soviet civil defense directives on industrial hardening are being followed remains inadequate.

268. We are unable to judge the effectiveness of the hardening measures discussed above but studies are underway to assess them. Our impression is that the hardening measures we know about would be effective in reducing collateral damage to economic facilities which were not the primary targets of attack.

#### *Shelters at Industrial Facilities*

269. The provision of shelters at industrial facilities is also an integral element of the hardening process on which the Soviets rely to ensure stability of operations at installations of the national economy. As indicated in the section of Chapter VI covering trends in Soviet policy on shelter construction, emphasis on shelter construction began again in the late 1960s. Since receipt of the report describing the 1969 Gosstroy instructions on shelter construction, several sources whose positions in industry gave them access to such data have stated that this mandatory program is being implemented in new industrial construction. For example, a source who worked on planning of new plant construction for the Ministry of the Chemical Industry stated that as of late 1968 all plant designs had to include civil-defense-approved, standard-design shelters. The shelters for industrial use, both built-in and detached, are to be used not only for personnel but for materiel as well. Thus, by providing safe areas for storage of sensitive equipment the Soviets add another dimension to their hardening efforts.

270. The development of a broad network of shelters for workers and materiel at enterprises—coupled with the dispersal system described in Chapter VI, whereby in wartime one shift would continue to operate production lines while the remainder of the work force would be housed out of the danger zone—will probably continue for some time to be the Soviets' principal response to their industry's vulnerability to nuclear attack. This pro-

gram appears to be a long-term effort which should provide significant protection to those elements of the work force remaining at their production posts and also needed to perform repair work in the event the installation suffers damage.

#### *Underground Industrial Facilities*

271. Soviet familiarity with, and interest in, construction of underground industrial enterprises dates at least from World War II. After their occupation of Eastern Europe the Soviets were able to inspect at first hand, and learn from, the considerable German efforts in underground operations. In his frequently cited book *Military Strategy*, the late Chief of the Soviet General Staff, Marshal Sokolovskiy, described the importance of underground industrial enterprises as follows:

Ensuring the viability of industry, especially heavy and military industry, is a most important aspect of the preparation of industry for war. . . . The most important industrial enterprises should preferably be located underground in premises prepared beforehand for this purpose.

272. Construction of underground complexes may have been underway at various locations within the USSR itself from the late 1940s to the late 1950s, according to plain-text messages which identified organizations specializing in underground construction, most of which had been associated with Moscow subway construction entities. The intercepted traffic indicated that these organizations were at work on projects at a number of locations in the Caucasus, Central Asia, Siberia, and the Far East. In no case did the area of reported activity correspond with any location of confirmed or likely subway construction.

273. Since then there have been several reports from human sources concerning underground production facilities in various parts of the USSR. In some cases the plants were wholly below the surface and were reported to be engaged in current production from the underground facilities. In others, the underground element was reported to be producing military items while that element of the complex located aboveground produced for the civilian economy. One such plant in the Urals turned out trucks and bulldozers at the aboveground plant, while the underground facilities produced armored vehicles. A second such complex has been reported to exist near Kremenchug in the Ukraine. Its aboveground production is railway rolling stock; the underground facilities allegedly produce amphibious tanks.



274. Other reporting states that some defense industries in major centers such as Moscow have standby underground facilities "which can be used to duplicate destroyed enterprises, production shops, and scientific laboratories." While most reports on underground facilities have related them to defense industry production, one source reported an extensive underground facility at a shoe factory and photographic paper factory in Leningrad.

275. To date we have not been able to confirm the underground production facilities reported above. There is firm evidence, however, of an underground facility—at Dodonovo near Krasnoyarsk. This multi-functional defense industry installation is believed to be a major nuclear-related facility. In addition, there is recent evidence of another underground installation, possibly a power plant, in Sevastopol. This underground production facility was reported by an individual [

] He described a large ferro-concrete structure, the entrance to which began in a tunnel, about 50 m (164 ft) long, leading from a cliff face. One of the shops in this installation was reported to be about 75 m long and 24 m wide (246 by 79 ft).

#### E. Emergency Relocation of Industrial Facilities

276. According to Sokolovskiy, "The evacuation of industries is usually provided for in the plans for mobilizing the national economy and is closely related to the mobilization plan of the Armed Forces." Relocation of industry during or subsequent to hostilities was an important ingredient in Soviet strategy during World War II, as noted in the discussion of macrodispersal. In the nuclear age, however, this becomes a less viable alternative as the period of warning diminishes. For this reason, emphasis has been placed on the various hardening measures described above to permit continued production of defense-related equipment provided for in economic mobilization planning. There has, however, been some reporting from human sources suggesting Soviet plans to relocate certain defense plants to previously selected sites in remote areas as soon as warning of impending hostilities is received. The evidence available on Soviet preparations to carry out these plans is limited, and information on them is difficult to obtain. The plans are classified and known only to the plant's top management.

277. One source stated that the operations of his design bureau in Odessa would be shifted 70 km (43 mi) away to a village where underground shelter and working facilities had been prepared. A source from eastern Siberia described a relocation site 150 km (93 mi) from Irkutsk for his institute but noted that no effort had been made to stockpile material there or otherwise prepare the site for continuing operations. In some cases it is difficult to distinguish in emigré reporting between relocation sites for actual production and facilities to which plant personnel would be dispersed in accordance with procedures described in Chapter VI.

278. One source has provided details on procedures whereby a defense electronics plant would move its production lines to a previously surveyed yet unimproved site as soon as the alert order was received. The source, who occupied a management-level position and had access to the planning, stated that the relocation site was chosen with these criteria in mind:

- away from potential military targets; and
- located near railways, power lines, water supply and gas pipelines.

To avoid pinpointing the location of the site to hostile aerial observation in advance of hostilities, no preparatory work was done prior to the move, such as clearing trees or laying foundations. The source contended that within two days after the move began, the site would be ready to receive machinery which would be installed in large army tents and specially designed inflatable buildings. Movement of equipment and the stockpiled parts for continued production would be accomplished by transport and working vehicles organic to the plant. The source estimated that approximately two weeks would be required to complete the move and resume production. To date only this one source has reported on this form of emergency relocation to an unimproved site. It is not known to what extent this approach has been followed by other installations.

#### VIII. CIVIL DEFENSE TRAINING AND EXERCISES

279. The Soviet civil defense training program stresses the education of all citizens—civilian and military—in the means of protection against effects of mass destruction weapons. Lectures and literature are the basic means of education, with increasing emphasis being placed on practical demonstrations and exercises requiring active participation by

trainees. Greater stress is being placed on the preparation of active cadres than on mass indoctrination.

280. In theory, the whole concept of training is to ensure the survival of the individual so that he can personally and collectively contribute to the protection and restoration of the Soviet state; training of both civilian and military personnel stresses the interface between them, since "the soldiers and the workers stand together, as one." To ensure his survival, the individual must know how to react during a war alert, shield himself from nuclear effects, and survive the postattack era, with or without special equipment or supplies. Training stresses self-sufficiency and initiative on the part of the individual but not a go-it-alone attitude, since he must band together with others to serve the collective purposes of Soviet society and the state in wartime actions and postwar recovery. In training, as in other aspects of the civil defense program, those facilities and enterprises to which the regime has accorded high priority in war survival appear to have the most intensive, regularly conducted training activities.

281. There is much evidence on the existence of training and exercises and comparatively little on the specific results needed to permit reliable judgments on effectiveness and value. Handbooks and other literature abound with instructions on what is to be taught and how to teach it. They also cover the need for practical exercises and how to conduct them. When discussing results, authors of articles in open literature are characteristically complimentary with shortcomings ignored, played down, or generalized to the point where they cannot be evaluated. Writings with restricted distribution are more critical.

282. Recent reporting by human sources on their experience in training programs confirms these trends, but continue to reflect general lack of public enthusiasm. At the same time, when asked specifically if the system would function in an emergency, most of these sources respond positively, adding that in the Soviet Union the population will follow orders when given by civilian and military authorities. It is our judgment that public enthusiasm and widespread public participation in drills are not necessary to carry out rescue and restoration operations in an emergency. Public understanding in advance about what to do and how to do it is important. In their training program the Soviets are concentrating on those capabilities critical to successful operations in an emergency; this includes a well-defined organiza-

tional structure, a reliable means of command and control, and well-trained and equipped task units which are exercised frequently by responsible and knowledgeable leaders.

#### A. Planning

283. The Soviet concept for training the general population is to bring instruction to people where they live and work, so as to make civil defense a part of their daily lives, rather than something a person goes away to do occasionally and then ignores. This principle applies to all segments of society—urban dwellers, rural residents, factory workers, and the military. The Soviets claim to have an infrastructure capable of accomplishing this type of training, and evidence tends to support this claim, particularly in the industrial and military sectors. In addition to training the Soviets require practice in the form of demonstrations and exercises of varying size and scope. Evidence is clear that demonstrations and exercises take place, but their extent and degree of success have not been fully and reliably measured. More important in Soviet planning than the level of training and civil defense skills of the general population are the readiness and preparations of the civil defense organizations, cadres, and services.

#### B. Training of the General Population

284. The largest task in training the general population involves urban residents, because of their number and their location in likely target areas. In 1954, civil defense training for the general population became compulsory, requiring an annual minimum of 20 hours per person, mostly classroom instruction. Training focuses on weapon effects and how to use equipment. The individual actions and skills stressed included use of masks, decontamination techniques, knowledge of alert signals, of assembly points, and of personal supplies and equipment needed, and how to build and live in expedient shelters in relocation zones.

285. Training of urban dwellers not participating actively in civil defense services or formations at their place of work is accomplished primarily through the schools and neighborhood organizations. Some 16 million to 20 million students receive mandatory training at schools beginning in the second grade, especially during militarization training and in summer camps (see Figure 34). The schools also serve as assembly points and training sites for local residents in

Figure 34. Civil Defense Instruction in Soviet School

Civil defense training is mandatory in Soviet elementary and secondary schools. Here, students are instructed in the use of protective masks.



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the evening. Apartment complexes have selected residents who help disseminate civil defense information and assist in training exercises and who would marshal residents in case of evacuation. Similar individuals serve in areas of single-family dwellings. The Communist Party cell apparatus affords a means for disseminating information, and party functionaries periodically attend training functions to demonstrate government interest in civil defense and concern over protection of the people.

286. The quality of training for many urban dwellers is difficult to assess on a nationwide scale. Human source reporting is nearly unanimous on the poor quality and irregularity of much of the training conducted for urban residents not associated with essential institutions and installations. Since attendance is required on the individual's own time, training is often not well received, but through sheer repetition the training probably has a positive learning value to the trainee. The best results appear to be among the children, because of their youth and consequent receptivity, and among the older people who experienced World War II.

287. In rural areas, civil defense training stresses:

- protecting people, livestock, and agricultural products from chemical, biological and radiological (CBR) effects; and
- receiving and hosting evacuees from urban areas.

Because of the small size and close-knit structure of villages and state and collective farms, training there appears more practical and better received than among the more cosmopolitan residents of cities. Soviet publications report better results among rural groups than among groups in cities, and more confidence that rural trainees know and can demonstrate the training they have received. For rural residents not living in villages and state and collective farms, training is less structured and more sketchy, essentially being confined to literature, broadcasts, and occasional visits by traveling instructors. It is not possible, however, to confirm Soviet writings about the state of training in rural areas through emigré sources, since few of the emigrés have lived or worked in agriculture or the rural economy.

### C. Cadre Training

288. The Soviets appear to be convinced that the success of civil defense operations will depend on the state of training and preparation of full-time civil defense units, particularly cadres for industry and for communal services in cities.

289. To the Soviets, their long-term struggle to establish a modern industrial base warrants special attention to training for industrial workers. In industries there are workers organized in formations and trained in services such as first aid, provision of masks and protective clothing, and firefighting. Special recognition is given to such cadres, and members appear in some cases to take much pride in their units. They practice their skills at special sites and participate in civil defense drills at their industries, including operation of industrial command posts and relocation to dispersal areas. In addition to instruction in survival, industrial workers are trained in measures necessary to assure continuity of production, involving protection of equipment, supplies, power and fuel, and finished products. High-priority industries are believed to have the best trained, most capable cadres, although training and exercises are not always conducted in a satisfactory manner. In a 1975 article, General Altunin chided factory managers who use civil defense exercises for repair work on their buildings while neglecting other aspects of the training such as firefighting or practice dispersal.

290. The Soviets also have cadres needed to ensure operation of public utilities and services such as transportation and medical care. These cadres are composed of urban technicians and specialists normally responsible for these services, and they in turn instruct and supervise others assigned to assist in these activities during emergencies. Institutes, research centers, and similar facilities also train cadres.

291. Competition between individuals and groups has been cited in Soviet publications as a means of stimulating interest and participation by those involved in exercises. Several human source reports have commented favorably on the way in which competition between civil defense formations has added interest for participants. A contest between firefighting formations conducted in a republic capital in February 1976 so intrigued the participating fire brigades that they neglected to answer local fire alarms.

292. To add realism to training, special sites called training villages reportedly have been constructed in

many parts of the country. These sites contain mockups and models which afford realistic conditions for practice of firefighting, decontamination, and other civil defense skills (see Figure 35).

### D. Military Civil Defense Units

293. The work and training of military units assigned to civil defense have been reported on in detail by individuals who have served in these units, which have the primary wartime mission of emergency rescue and restoration of targets of random destruction. They perform a range of tasks from decontamination to road repair. The units are capable of rapid augmentation and expansion. Training is frequent and stresses three themes:

- updating the unit's knowledge in its subject speciality,
- instruction in its civil defense role, and
- interrelationship between civilian civil defense components and non-civil-defense military units.

This last theme ties the unit's training to that of civilian units, including the augmenting of urban communal services, should conditions strain the capability of civilian units.

294. The Soviets provide specialized training for officers assigned to both the military civil defense units and to the civil defense staffs. Junior officers for civil defense forces are graduated from the Civil Defense Academy and receive advanced training at the Higher Central Officers School of Civil Defense in Moscow.

### E. Tactical Military Units

295. Instruction of regular military units in protection against CBR weapons ranks high among training goals, and would be of value should tactical forces be tasked to augment civilian and military civil defense units. Having skills such as engineering or medicine, tactical units could quickly contribute to the civil defense effort with little or no training, if tactical commitments permit.

296. Individual civil defense training of internal security troops, construction troops, military reservists, and members of paramilitary organizations is largely limited to instruction in personal defense against CBR weapons. Units of these organizations could perform

Figure 35. Training Exercise at Soviet Civil Defense Village

This illustration from a Soviet civil defense publication shows members of a firefighting unit participating in an exercise at a training village.



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tasks in support of civil defense operations in their area of assignment.

297. In sum, military training has aspects which relate closely to civil defense functions, enabling tactical personnel to assist in peacetime as advisers and lecturers and to augment civil defense forces in wartime, if not committed to combat. However, despite the emphasis on the supporting role certain military units are to play in civil defense as described in Soviet open literature and classified publications, we have little evidence from other sources, such as former officers and soldiers of such units, confirming that regular military units plan and conduct training for civil defense operations. While both open literature and human sources have described the participation of military units in actual civil defense operations following a natural disaster, these sources are not clear about whether the units were civil defense formations or regular military units.

#### F. Exercises

298. The Soviets claim to place great value on exercises as a test of plans and procedures. Also, according to a military spokesman:

It is only with practical exercises that we can convince any individual of and demonstrate the vital necessity for the particular measures directed toward improving civil defense against modern weapons.

299. Soviet authorities stress that exercises are needed across the board, from the national-level organization to neighborhood teams at the lowest level. Recently there have been calls by the Chief of Civil Defense to undertake more ambitious testing called "complex" exercises whereby command staffs would involve all units under their command in simulated operations for nuclear war. For exercises simulating nuclear strikes on factories or farms, it was envisioned that all or most civil defense units would participate, as would nearby families of workers or farmers.

300. Soviet literature contains references to actual exercises involving ground play, as distinct from command post exercises. Some have been confirmed through HUMINT. Most have been small-scale, involving a certain village, a single industrial plant or institute, or a city district, with the primary purpose of testing civil defense units and cadres rather than the general population. Some recent ones have been more ambitious, perhaps reflecting Altunin's demand for

integrated city and rural civil defense exercises. One exercise of this type occurred in 1975 at Lytkarino, a town of 40,000 people near Moscow and a probable relocation site for Muscovites. According to Soviet publications, thousands of people participated, communication and reconnaissance operations were conducted, and shelters were occupied by local workers. Another 1975 exercise, in Tul'skaya Oblast, involved the city of Kimovsk in Kimovskiy Rayon; this was known as an "integrated rayonal exercise." There may have been other such exercises of which we are not aware. The term "integrated rayonal exercise" may appear with increasing frequency in civil defense contexts if Altunin's policies on exercises are carried out.

301. Staff exercises have been frequent in the past, and there are indications that several have taken place during the past year. Procedures appear to conform to those described in open literature and other reporting.

302. Practical experience in civil defense operations has been afforded by a series of natural disasters which have struck the Soviets in recent years. The forest and peat fires around Moscow in the summer of 1972 involved civilian and military civil defense units, and finally regular military units in coordinated efforts to curb and extinguish these widespread conflagrations, whose smoke and odor were evident in downtown Moscow. We are not certain of the organizational and command arrangements employed during this emergency. For the November 1975 hurricane at Odessa, all elements of civil defense, plus regular military units, functioned under a single military command. The series of earthquakes in Soviet Central Asia in the spring of 1976 also triggered the civil defense apparatus, requiring medical aid, emergency housing, and other assistance. Again, in this case, civilian and military civil defense units as well as regular military elements operated under military command.

303. Several intelligence sources have provided information on the actual ground play in Soviet exercises. Tests have been made of evacuation by various means, including ships and river boats as well as trucks and railroads. Industrial cadres have gone to dispersal areas, worked on shelters and facilities, and practiced communications links with their factory. According to open literature, shelters in evacuation areas have been built by young people during summer patriotic training, and industrial workers have practiced the stockpiling and use of materials needed to

sandbag machinery and to provide protective measures for equipment. Practice warning drills are frequent in factories, institutes, and schools and for the general public. In drills for the general public, the normal procedure is for people to report to the neighborhood school, where they are registered, lectured, provided practical demonstrations, and then excused.

### G. Trends

304. Soviet authorities continue to accord high priority to the training of military and civilian elements of civil defense.

- The principal emphasis in civil defense training is on the primary task elements, especially the cadres assigned to communal services and formations at industries and institutions.
- Orientation of the general public, heavily emphasized in the 1960s, remains part of the program despite continued lack of enthusiasm for it among most of the population.
- Increased attention to civil defense training in the educational system suggests that the Soviets intend to rely primarily on this means for instruction of the public.
- As the number of civil defense regiments and related troop units has grown, according to reports, their training programs have expanded.
- To increase interest in all forms of training, civil defense officials have instituted the use of competition among units, cadres, and formations.
- Although Soviet authorities have assigned a civil defense role to regular units of the armed forces, there is little evidence that they are engaged in civil defense training.
- There has been an increase in the number and scope of practical exercises at various levels, ranging from staffs and formations at industrial enterprises to major civil defense headquarters and all the units under its control. Accounts of such exercises in Soviet open literature have in many cases been confirmed by intelligence sources.

305. We are unable to evaluate the success of the civil defense training program in improving the

effectiveness of civil defense preparations and readiness. The Soviets themselves are probably unable to evaluate how well their training program improves combat readiness. For better indications of effectiveness we need more hard evidence on the competence of instructors, level of participation, frequency of exercises, and exercise scenarios. Critiques by the Soviets themselves are no substitute for this kind of insight. The evidence we have points to improvements in the training of those civil defense organizations on which greatest reliance would be placed in a crisis—the staff structure, civil defense troops, and the civilian cadres and formations responsible for essential services. A more informed estimate of the training program for these elements and its effectiveness will have to await additional evidence.

## IX. EXPENDITURES FOR CIVIL DEFENSE

### A. Estimates

306. The US Intelligence Community does not have reliable estimates of the costs of Soviet civil defense. The USSR regards annual civil defense expenditures as classified information within its national or military budget. As a result, civil defense expenditures do not appear as an identified item in published Soviet budgetary data. Some financial information is available, but it is extremely fragmentary and provides an inadequate basis for estimating total expenditures.

307. The available data indicate that funding and provision of resources for civil defense are not centralized. The 1961 Central Committee decree on civil defense provided for the financing of civil defense activities from union, republic, or local budgets and from administrative and operating funds of self-supporting enterprises and organizations. The Ministry of Defense pays for military personnel, their civil defense equipment, and for materials involved in construction of some special projects.

308. Fragmentary items about the financing of Soviet civil defense activities have become available from time to time which reflect the dispersal of authority for civil defense funding noted in the 1961 decree.

309. In the absence of Soviet budget data, one way to estimate costs would be to inventory the identifiable parts of the actual program, apply cost factors to these components, and sum the results. This approach requires a more complete and consistent body of detailed information than we have had up to now on

items such as manpower, the number and types of shelters and bunkers, major equipment, and cost factors. We are just beginning to get some of the information needed to attempt this kind of analysis, and even now data are unevenly distributed in these item categories.<sup>49</sup>

310. The principal cost-generating elements in the civil defense program seem to be manpower, shelter and bunker construction, and, possibly, communications. These are the elements on which any future costing work probably should concentrate.

#### B. Trends

311. In order to establish the trend of costs over time, it would first be necessary to establish consistent and reliable estimates of aggregate costs for several years. As noted above, at present we do not have such an estimate for a single year.

312. In the absence of a series of annual cost estimates, it is tempting after surveying Soviet civil-defense-related activities to conclude that if some phase of the activity is expanding, then total costs must be growing. Expenditures for some activities—shelter construction, for example—probably have been increasing in recent years. Even in the areas of expansion, however, it should be noted that additional expenditure over time does not necessarily equate with a greater degree of effective protection. The following paragraphs suggest a number of points that one should keep in mind if exaggerated estimates of the cost of Soviet civil defense programs are to be avoided.

313. If one tries to estimate the likely trend of expenditures from the limited data available, care

<sup>49</sup> It should be emphasized that this method—direct costing—can provide estimates of total expenditures only if all elements of the program are specified.

must be taken to distinguish new programs from old programs whose existence may have been undetected for a period of years. Also one must distinguish cost-generating activity from those measures and programs which, even though they loom large in Soviet statements, use few resources to which cost can be attached.

314. There seem to be many activities in the program which, because of their nature or the way the Soviets carry them out, entail little or no budgetary cost, for example:

- Some training depends on contributions of personal time by those receiving training.
- The expedient field shelter program is not an expensive activity.
- Evacuation plans are not costly if they have not been tested by major exercises.
- Most of the equipment requirements are satisfied by civil defense application of equipment used in peacetime activities.
- The program lacks high-cost items of the kind found in military programs where costs are driven by weapon systems embodying expensive and technologically advanced hardware.

315. A related problem in assessing trends in expenditures is that of distinguishing, in any given activity, costs attributable to civil defense among the costs that should be assigned to other motivations, such as economic development. This problem is present in many of the activities described elsewhere in this memorandum, including construction of new towns and factories and dispersal of industry. Assigning to civil defense all the cost for any of these activities would be an overstatement of the costs of Soviet civil defense programs.



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